



# old Lessons new Thoughts

Readings in Logistics,  
History, Technology,  
and Leadership

Air Force Logistics Management Agency

**The Editors, Air Force Journal of Logistics**

**James C. Rainey, Editor-in-Chief**

**Beth F. Scott, Editor**

**Captain Ann M. C. Gayer, Contributing Editor**

**Air Force Logistics Management Agency**

**501 Ward Street**

**Maxwell AFB, Gunter Annex, Alabama 36114-3236**

**February 2004**

# old Lessons new Thoughts

Introduction .....	5
Oil Logistics in the Pacific War .....	14
German Wonder Weapons: Degraded Production and Effectiveness .....	46
Warfighter Support: Medical Supply Platoons (Aviation) in WWII .....	70
From First to “Wurst”: The Erosion and Implosion of German Technology During WWII .....	96
Battle of the Kasserine Pass: Examining Allied Operational Failings .....	120
Advanced Military Technologies: Morality of Modern Warfare .....	142
21 <sup>st</sup> Century Leadership: Leading the “Nexters” Generation .....	156



*Throughout the history of warfare, crucial strategic and tactical decisions were often direct reflections of the logistical needs and capabilities of opposing armies. There is no reason to suspect that this will change in the future, and the literature addressing it is still sparse and scattered.*

*More than most professions, the military is forced to depend on intelligent interpretation of the past for signposts charting the future. Devoid of opportunity, in peace, for self-instruction through actual practice in his profession, the soldier makes maximum use of historical record in assuring the readiness of himself and his command to function efficiently in emergency. The facts derived from historical analysis, he applies to conditions of the present and the proximate future, thus developing synthesis of appropriate method, organization, and doctrine.*

—General Douglas MacArthur

## **Logistics and History**

Understanding the elements of military power requires more than a passing knowledge of logistics and how it influences and, in many cases, dictates strategy and tactics. *An understanding of logistics comes principally from the study of history and the lessons history offers.* Unfortunately, despite its undeniable importance, surprisingly little emphasis is placed on the study of history among logisticians and the lessons to be found and studied. To compound matters, there is no shortage of literature dealing with the strategic and tactical decisions that have led nations and commanders to victory and defeat. Too often, however, the chronicles of warfare tend to resemble a strategic board game, with commanders

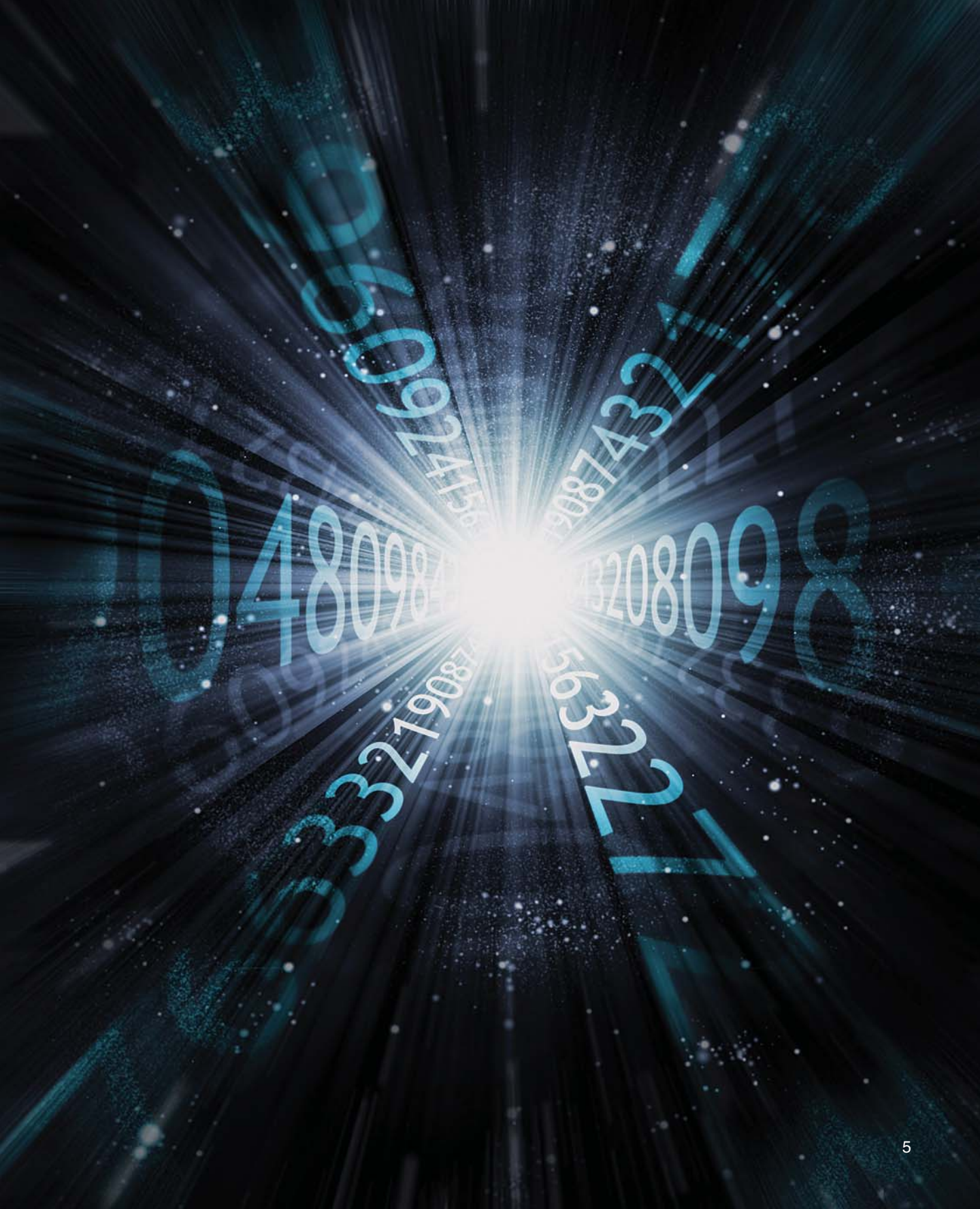
# **Introduction**

## **Readings in Logistics, History, Technology, and Leadership**

**James C. Rainey**  
**Beth F. Scott**  
**Ann M. C. Gayer**

seemingly able to move their forces and resources about at will—feinting, encircling, massing, and thrusting toward their objectives.<sup>1</sup> A close examination, however, reveals that, throughout the history of warfare, crucial strategic and tactical decisions were often direct reflections of the logistical needs and capabilities of opposing armies. There is no reason to suspect that this will change in the future, and the literature addressing it is still sparse and scattered.

Two major themes underpin and serve to validate the need for the study of logistics history. First, it is abundantly clear that the availability of



---

## Introduction

*Interestingly, the word logistics entered the American lexicon little more than a century ago.*

raw logistical capability—the appropriate kinds of war materiel produced and moved rapidly to where needed—has done much to determine the potential for victory or defeat throughout military history. This has been true across the spectrum of conflict—from wars of worldwide magnitude to conflicts of significantly more limited scale. Second, the manner in which this logistical capability has been integrated and synchronized with strategies and tactics was key in the location, timing, tempo, and outcome of critical military engagements.

General Mathew B. Ridgway once observed, “What throws you in combat is rarely the fact that your tactical scheme was wrong...but that you failed to think through the hard cold facts of logistics.” Logistics is the key element in warfare, more so in the 21<sup>st</sup> century than ever before. Success on the modern battlefield is dictated by how well the commander manages available logistical support. Victories by the United States in major wars (and several minor wars or conflicts) in the 20<sup>th</sup> century are linked more directly to the ability to mobilize and bring to bear economic and industrial power than any level of strategic or tactical design. The Gulf War and operations to liberate Iraq further illustrate this point. Long before the allied offensive could start, professional logisticians had to gather and transport men and materiel and provide for the sustained flow of supplies and equipment that throughout history has made possible the conduct of war. Commanders and their staffs inventoried their stocks, essayed the kind and quantities of equipment and supplies required for operations in the severe desert climate, and coordinated their movement plans with national and international logistics networks. “*The first victory in the Persian Gulf War was getting the forces there and making certain they had what they required to fight* [Emphasis added]. Then and only then, would commanders initiate offensive operations.”<sup>2</sup>

In 1904, Secretary of War Elihu Root warned, “Our trouble will never be in raising soldiers. Our trouble will always be the limit of possibility in transporting, clothing, arming, feeding, and caring for our soldiers ....”<sup>3</sup> Unfortunately, the historical tendency of both the political and military leadership to neglect logistics activities in peacetime and expand and improve them hastily once conflict has broken out may not be so possible in the future as it has in the past. A declining industrial base, flat or declining defense budgets, force drawdowns, and base closures have all contributed to eliminating or restricting the infrastructure that made rapid expansion possible. Regardless, modern warfare demands huge quantities of fuel, ammunition, food, clothing, and equipment. All these commodities must be produced, purchased, transported, and distributed to military forces. And of course, the means to do this must be sustained. Arguably, logistics of the 21<sup>st</sup> century will remain, in the words of one irreverent World War II supply officer, “the stuff that if you don’t have enough of, the war will not be won as soon as.”<sup>4</sup>

Interestingly, the word logistics entered the American lexicon little more than a century ago. Since that time, professional soldiers, military historians, and military theorists have had a great deal of difficulty agreeing

on its precise definition.<sup>5</sup> Even today, the meaning of logistics can be somewhat *fuzzy* in spite of its frequent usage in official publications and its lengthy definition in service and joint regulations. The eminent historian Stanley Falk describes logistics on two levels. First, at the intermediate level:

Logistics is essentially moving, supplying, and maintaining military forces. It is basic to the ability of armies, fleets, and air forces to operate—indeed to exist. It involves men and materiel, transportation, quarters, depots, communications, evacuation and hospitalization, personnel replacement, service, and administration.

Second, at a higher level, logistics is:

...economics of warfare, including industrial mobilization, research and development, funding procurement, recruitment and training, testing, and in effect, practically everything related to military activities besides strategy and tactics.<sup>6</sup>

While there are certainly other definitions of logistics, Falk's encompassing definition and approach provides an ideal backdrop from which to examine logistics from a historical perspective.

### Technology and Logistics

Technology (to include technological change and technological innovation), as a subject, covers a lot of ground and often enjoins heated debate. It has proven to be one of the major tools for dealing with problems, more so in this century than at any other time in history. However, critics of technology argue that it often causes as many problems as it solves and that the new problems are often far worse than the old ones. Further, they question its validity as a major tool for solving complex problems rooted in ethical, philosophical, political, or other nontechnical areas.<sup>7</sup> These are certainly by no means all the criticisms of technology, but they serve to frame the basic objections. The counter argument to these criticisms would answer that technology is not unique in creating new and, often, more difficult problems, while solving old ones. Very much the same criticism could be aimed at all approaches to problem solving. No problem-solving approach yields simple, final answers to the basic problems of humankind.<sup>8</sup> One could even argue that philosophical and other nontechnical approaches have done little when measured against the same standards, they fail just as abjectively as technology.<sup>9</sup> Further, the fact that technological solutions are inappropriate in certain situations does not mean that technology is always unsuited to problem resolution. Technology cannot be viewed as a separate entity within either the military or society in general. This illusion of discreteness simply does not exist. It is and will remain an integral part of both. The real issue is to recognize that technology is a tool with limitations, and these limitations should be considered in reacting to particular situations. Technology does not offer a *silver bullet* for all situations.

*The real issue is to recognize that technology is a tool with limitations, and these limitations should be considered in reacting to particular situations. Technology does not offer a silver bullet for all situations.*



---

## Introduction

*Significant organizational, intellectual, and technological changes are seen during periods of transition. The major change, however, must be intellectual. Without this, technological change becomes meaningless and organizational change impossible.*

Organizational change should and must accompany technological change if new capabilities are to be exploited. Stephen Rosen in *Winning the Next War* points out that innovation does not always result from new technologies. Rather, new technology simply may be used to improve the ability to perform a particular mission.<sup>10</sup> The relations among technological innovation, fundamental military operations, and changes in concepts and organizations are nonlinear. That is, changes in input may not yield proportionate changes in output or other dynamics.<sup>11</sup>

Significant organizational, intellectual, and technological changes are seen during periods of transition. The major change, however, must be intellectual. Without this, technological change becomes meaningless and organizational change impossible. The US military is now in a period of rapid change. Recent changes—order of magnitude changes—in technology have led to both long-range and strategic planning efforts that integrate current and future technological advances into operational concepts. In the logistics arena, these include Focused Logistics and Agile Combat Support. The vision of both these is the ability to fuse information, transportation, and other logistics technologies to provide rapid response, track and shift assets while en route, and deliver tailored logistics packages at all levels of operations or war (strategic, operational, and tactical).<sup>12</sup> This same vision includes enhanced transportation, mobility, and pinpoint delivery systems.<sup>13</sup> The operational forces that must be supported logistically will be smaller and more flexible—emphasizing mobility, speed, and agility. These forces will utilize technological superiority in stealth, precision weapons, surveillance, and dominant battlefield awareness.

Military logistics, at a more fundamental level, is in a period of transition brought about by the evolving information revolution. Many challenges concerning workflow, improving data integrity, and efficient communications still exist. A variety of human and cultural factors still impede full-scale adoption of many new information technologies—complexity and difficulty in the use of some systems, loss of control, changes in fundamental power relationships, uselessness of old skills, and changes in work relationships.<sup>14</sup> Change and instruments of change, as apparent as they seem once implemented, often elude understanding before they enter the mainstream.<sup>15</sup> As an example, Chester Carlson, the inventor of the photocopy machine (often referred to as the Xerox machine) was told by business that his invention was unnecessary because libraries and carbon paper already filled the need. This was a technology that drastically altered the way people approached information, yet finding interested businesses and investors in the beginning proved elusive.

Any discussion of technology and logistics would be lacking without citing Martin van Creveld. In *Technology and War*, he notes:

...technology and war operate on a logic which is not only different but actually opposed, nothing is less conducive to victory in war than to wage it on technological principles—an approach which, in the name of operations research, systems analysis or cost/benefit calculation (or obtaining the greatest



bang for the buck), treats war merely as an extension of technology. This is not to say...that a country that wishes to retain its military power can in any way afford to neglect technology and the methods that are most appropriate for thinking about it. It does mean, however, that the problem of making technology serve the goals of war is more complex than it is commonly thought to be. The key is that efficiency, far from being simply conducive to effectiveness, can act as the opposite. Hence—and this is a point which cannot be overemphasized—the successful use of technology in war very often means that there is a price to be paid in terms of deliberately *diminishing* efficiency.

Since technology and war operate on a logic which is not only different but actually opposed, the very concept of “technological superiority” is somewhat misleading when applied in the context of war. It is not the technical sophistication of the Swiss pike that defeated the Burgundian knights, but rather the way it meshed with the weapons used by the knights at Laupen, Sempach, and Granson. It was not the intrinsic superiority of the longbow that won the battle of Crécy, but rather the way which in interacted with the equipment employed by the French on that day and at that place. Using technology to acquire greater range, firepower, greater mobility, greater protection, greater whatever is very important and may be critical. Ultimately, however, it is less critical and less important than achieving a close *fit* between one’s own technology and that which is fielded by the enemy. The best tactics, it is said, are the so-called *Flaechenund Luecken* (solids and gaps) methods which, although they received their current name from the Germans, are as old as history and are based on bypassing the enemy’s strengths while exploiting the weaknesses in between. Similarly, the best military technology is not that which is “superior” in some absolute sense. Rather it is that which “masks” or neutralizes the other side’s strengths, even as it exploits his weaknesses.

The common habit of referring to technology in terms of its capabilities may, when applied within the context of war, do more harm than good. This is not to deny the very great importance of the things that technology can do in war. However, when everything is said and done, those which it cannot do are probably even more important. Here we must seek victory, and here it will take place—although not necessarily in our favor—even when we do not. A good analogy is a pair of cogwheels, where achieving a perfect fit depends not merely on the shape of the teeth but also and, to an equal extent, on that of the spaces which separate them.

In sum, since technology and war operate on a logic which is not only different but actually opposed, the conceptual framework that is useful, even vital, for dealing with the one should not be allowed to interfere with the other. In an age when military budgets, military attitudes and what passes for military thought often seem centered on technological considerations and even obsessed by them, this distinction is of vital importance. In the words of a famous Hebrew proverb: The deed accomplishes, what thought began.<sup>16</sup>

*Old Lessons, New Thoughts* is a collection of seven essays or articles that lets the reader examine logistics and technological lessons from history that are particularly applicable in today’s transformation environment.

In “Oil Logistics in the Pacific War,” Lieutenant Colonel Donovan makes the case that the Japanese strategic disregard of the fragile US oil infrastructure in the Pacific was an incredible oversight on their part. The Japanese should have attacked the US oil supply at Pearl Harbor and

*Chester Carlson, the inventor of the photocopy machine (often referred to as the Xerox machine) was told by business that his invention was unnecessary because libraries and carbon paper already filled the need. This was a technology that drastically altered the way people approached information, yet finding interested businesses and investors in the beginning proved elusive.*

---

## Introduction

*The views expressed in the articles are those of the authors and do not represent the established policy of the Department of Defense, Air Force, Air Force Logistics Management Agency, or the organization where the author works.*

followed up that raid with attacks on US oilers and tankers in the Pacific. Japanese attacks, in conjunction with German strikes, on the oil supply and infrastructure would have bought the Japanese much valuable time—time that could have been used consolidating gains in its newly won territories, time that might have allowed Japan to build up such a defensive perimeter that the cost of an Allied victory might have been too high.

“German Wonder Weapons: Degraded Production and Effectiveness” is a particularly salient piece when considering logistics transformation efforts. Major Schollars points out that the lesson Germany failed to learn is relevant today, as the United States moves to transform its military. Military planners, strategists, and designers must heed the lesson that it is not enough to produce high technology with a short-term strategy. Instead, they must make careful choices on what to develop in the budget-constrained economy and fully integrate new weapons with the support systems and people on which they depend. Further, the United States must effectively and realistically employ its transformed military to keep adversaries off balance. Producing, integrating, and employing new wonder weapons to strike targets for effects rather than brute destruction will bend adversaries to US will and allow the United States to attain its national security objectives. Germany lost the opportunity to become and remain a truly advanced power. America is totally dominant in many factors but must continue its ongoing transformation process to stay ahead and provide unmatched military effectiveness. Schollars uses many examples from World War II to support these points.

In “Warfighter Support: Medical Supply Platoons in WWII,” Major Ashmore sums up with lessons that are relevant today. First, the fast movement of the Army Air Forces (AAF) and Allied forces in World War II made mobility of the logistics *tail* a must. As the AAF units moved in World War II, so moved their logistics infrastructure, including their medical support. As a result, the medical supply platoon (aviation) had to keep pace and move quickly as the Army Air Forces moved forward. This was accomplished through sheer brute force that involved the moving of literally mountains of medical materiel. And second, the medical supply platoons (aviation) in World War II depended on the teamwork not only of their members but also amongst the platoons themselves. In his final point, he notes that the medical supply platoon (aviation) units in World War II demonstrated the importance of innovation.

“From First to Worst” examines the erosion and implosion of German technology during World War II. Major Pryor notes that as the Air Force begins its fourth major transformation in 11 years there are some striking similarities between what it currently faces and those challenges faced by World War II Germany: no joint control over acquisition programs and determining mission and needs.

Major Carr looks at allied operational and logistical failings in “Battle of the Kasserine Pass.” His key points are, first, the Battle of Kasserine

Pass clearly illustrates the effect of operational-level decisions on the conduct of tactical operations. At Kasserine, US and Allied forces were plagued by a poor, slowly emerging logistics system. Second, the shortcomings of the logistics system produced shortages of equipment and personnel and, ultimately, had an effect on the deployment of forces on the front lines. Third, in addition to logistics, the poor employment of forces on the Tunisian front resulted from decisions made by field commanders—decisions that resulted in forces being thinly dispersed and poorly massed for operations. Finally, the Americans and Allies were guilty of ignoring the principles of unity of command or effort and security.

While both logistics and technology were discussed in the first five readings, Major Lang shifts the focus to technology and the morality of modern warfare. He argues that, to the extent precision-guided missiles and other technological revolutions provide significant advantages on the battlefield, the United States and other nations in possession of these technologies should understand the moral implications associated with their employment. The possession and use of these weapons increasingly requires moral accountability and constraints, specifically in adherence with the *jus in bello* principles of proportionality and discrimination to guard against careless use.

The finally reading written by Major Eisenhower examines leading the next generation of airmen, the generation he calls the *nexters*. The research that went into the preparation of this article and the points made make this required reading for anyone who will command a maintenance group or mission support group. Eisenhower sums up by noting:

Leadership and command of the Nexters is a challenge for Baby Boomers and Xers. Baby Boomers do not want to let go of the reins; Xers just now are finding their footing in a world that once overlooked them, while Nexters are technically capable of hitting the ground running in any capacity within a company or the military ranks. Followership will not be a problem for the Nexters, and they will not shrink from taking command when it is their turn. But retention of superb leaders throughout the younger Xer and the new Nexter ranks will be the toughest leadership challenge of Baby Boomers and older Xers.

Additional copies of *Old Lessons, New Thoughts* are available at the Office of the Air Force Journal of Logistics.

Air Force Journal of Logistics  
50 Chennault Circle  
Alabama 36112-6417

Material contained in *Old Lessons, New Thoughts* may be reproduced without permission; however, reprints should include the courtesy line “originally published by the Air Force Logistics Management Agency.”

The views expressed in the articles are those of the authors and do not represent the established policy of the Department of Defense, Air Force,



Air Force Logistics Management Agency, or the organization where the author works.

### Notes

1. John A. Lynn, ed, *Feeding Mars: Logistics in Western Warfare from the Middle Ages to the Present*, San Francisco: Westview Press, 1993, vii.
2. Charles R. Shrader, *U.S. Military Logistics, 1607-1991, A Research Guide*, New York: Greenwood Press, 1992, 3.
3. Shrader, 9.
4. Julian Thompson, *The Lifeblood of War: Logistics in Armed Conflict*, Oxford: Brassy's, 1991, 3.
5. George C. Thorpe, *Pure Logistics*, Washington DC: National Defense University Press, 1987, xi.
6. Alan Gropman, ed, *The Big L: American Logistics in World War II*, Washington DC: National Defense University Press, 1997, xiii.
7. John E. Jordan, Jr, and Thomas C. Lobenstein, "Technology Overview" from *Low-Intensity Conflict and Modern Technology*, ed, Lt Col David J. Dean, Maxwell AFB, Alabama: Air University Press, 1986, 105.
8. *Ibid.*
9. Jordan and Lobenstein, 106.
10. Stephen P. Rosen, *Winning the Next War: Innovation and the Modern Military*, Ithaca, New York: Cornell University Press, 1991, 134.
11. Murray Williamson, "Innovation: Past and Future," *Joint Forces Quarterly*, Summer 1996, 52.
12. Chairman, Joint Chiefs of Staff, *Joint Vision 2010*, Washington DC: Pentagon, 1996, 24.
13. *Ibid.*
14. Cassie B. Barlow and Allen Batteau, "Is Your Organization Prepared for New Technology?" *Air Force Journal of Logistics*, Vol XXI, No 3&4, 24.
15. Norma R. Klein, "Technology Trends and Logistics: An Interrelational Approach to Tomorrow," *Air Force Journal of Logistics*, Vol XIII, No 2, 36.
16. Martin van Crevald, *Technology and War*, London: The Free Press, 1989, 319.

---

## Generating Solutions Today, Shaping Tomorrow's Logistics

**S**ince its inception, the Air Force Logistics Management Agency has grown to be recognized for its excellence—excellence in providing answers to the toughest logistics problems. And that's our focus today—tackling and solving the toughest logistics problems and questions facing the Air Force. It's also our focus for the future.

Lots of organizations have catchy mottoes. Likewise, many have catchy vision statements. We do, too. But there's a big difference—we deliver on what we promise. *Generating Solutions Today, Shaping Tomorrow's Logistics* aren't just words to us; they're our organizational culture. We use a broad range of functional, analytical, and scientific expertise to produce innovative solutions to problems and design new or improved concepts, methods, systems, or policies that improve peacetime readiness and build war-winning logistics capabilities.

Our key strength is our people. They're all professionals from logistics functions, operational analysis sections, and computer-programming shops. Virtually all of them have advanced degrees, some of which are doctorates. But more important, virtually all of them have recent field experience. *They've been there and done that.* They have the kind of experience that lets us blend innovation and new technology with real-world common sense and moxie. It's also the kind of training and experience you won't find with our competitors. Our special blend of problem-solving capabilities is available to every logistician in the Air Force.

Our track record puts us in the lead in delivering robust, tailored answers to the most difficult and complex Air Force logistics problems. This can be seen in our efforts and partnerships that are turning expeditionary airpower support concepts into real-world capability. It can also be seen in our work in making dramatic improvements to the Air Force supply system and developing high-impact logistics publications and our leadership in planning and making logistics play in wargames, simulations, and exercises truly meaningful. The message is also loud—we work the important projects that shape tomorrow's Air Force, and we deliver what our customers need today!

**Lieutenant Colonel Patrick H. Donovan, USAF**

**The Japanese were not the first to ignore the importance and vulnerability of logistics. As long ago as 1187, history shows that logistics played a key part in the Muslim's victory over the Crusaders at the Battle of Hittin. The Muslim commander Saladin captured the only water source on the battlefield and denied its use to the Crusaders.**

# **Oil Logistics**

## **In the Pacific War**

### **Oil's Role in Japan's Decision for War**

*The shortage of oil was the key to Japan's military situation. It was the main problem for those preparing for war, at the same time, the reason why the nation was moving toward war.... Without oil, Japan's pretensions to empire were empty shadows.*

**—Louis Morton**  
*Command Decisions*<sup>1</sup>

Oil played a crucial, if not the key, role in the Japanese decision to go to war with the United States in 1941. Because of the deteriorating political situation with the United States, United Kingdom, and Netherlands East Indies, the future of Japan's oil reserve and supply was in danger. When diplomatic efforts failed to resolve the political impasse, Japan made plans to seize militarily what it could not achieve diplomatically. An inevitability of this military option was war with the United States. With this in mind, the Japanese planned to







## Oil Logistics in the Pacific War



*To ship fuel out of areas with shortages to semibelligerent foreign governments was politically untenable for the US Government.*

eliminate any short-term American threat quickly and seize needed oil at the same time. Time, like the Japanese oil supply, was running out quickly.

### Oil Available in the Netherlands East Indies

June 1941 was a pivotal month for the future of Japanese oil supplies. The Japanese had been in economic negotiations with the Netherlands East Indies (NEI) Government in Batavia since September 1940 and were seeking a special economic position in the Netherlands East Indies. Previous embargoes of aviation fuel, iron, and scrap steel by the United States in July and October 1940 (to counter the Japanese occupation of northern French Indochina) had sent the Japanese searching for alternative sources of raw materials. Also, the entrance of Japan into the Tripartite Pact with Germany and Italy on 27 September 1940, a pact that was aimed directly against the United States, further exacerbated US-Japanese relations. The Netherlands East Indies seemed to fit this bill, the Nazis (a putative partner of the Japanese) had overrun the NEI's parent country, and its geographic location put the Japanese closer to the Netherlands East Indies than any of the latter's allies. Thus, the Netherlands East Indies was deemed to be more malleable to Japanese desires than the increasingly recalcitrant United States. Some of Japan's demands included participation in NEI natural resource development and freedom of access and enterprise in the Netherlands East Indies, as well as a steady supply of oil. However, Japanese aspirations were about to receive a serious setback.<sup>2</sup>

The NEI Government was willing to negotiate with the Japanese, but Batavia was not willing to yield special economic concessions to the Japanese (there were to be increases of nonpetroleum products). Although these increases were less than what was sought, they did fulfill Japanese needs. Japanese requests for larger exports of oil were passed on to the NEI oil companies, but these requests were deferred. Also, Japanese requests to conduct military and political activities in the Netherlands East Indies were also rejected. On 17 June 1941, economic talks were broken off between Japan and the Netherlands East Indies.<sup>3</sup>

Almost directly on the heels of the breakdown in talks between Batavia and Tokyo was an announcement from the United States on 20 June 1941 that, henceforth, no petroleum would be shipped from the US east coast, or gulf coast ports, outside the Western Hemisphere. There was a shortage of fuel for domestic use on the east coast of the United States in June 1941. To ship fuel out of areas with shortages to semibelligerent foreign governments was politically untenable for the US Government. Thus, from Japan's point of view, the commodity most desired by them was being choked off.<sup>4</sup>

Because of this reversal of fortunes, Japan felt it must make a move toward securing a source of oil in Southeast Asia:

Consequently, at an Imperial conference on 2 July, Japan decided to adopt the "Outline of the Empire National Policy to Cope with the Changing



Situation.” By executing a daring plan calling for the occupation of southern French Indochina, Japan hoped to gain dominance over the military situation in the southern areas and to force the Netherlands East Indies to accede to her demands.<sup>5</sup>

## Japan Needs a Secure Source of Oil

The move into southern French Indochina was not without some internal debate in Japan. In the end, however, it was decided that the military occupation of the territory was too good an opportunity to pass up. By occupying the southern half of French Indochina, the Japanese would consolidate their strategic position; it would stop the encroachment of the ABCD powers on her economic life line. Also, the occupation would be a blow to the Chungking government and help settle the China issue; it would also put pressure on the NEI Government to come to terms with Japanese demands.<sup>6</sup> The Japanese were not making this move as a step toward provoking the United States, Britain, or the Netherlands East Indies to war; Tokyo wished economic negotiations to continue. The move into southern Indochina was a preemptive action that would help the Japanese if conflict with the ABCD powers became inevitable.<sup>7</sup> One wonders if the Japanese later realized that their actions eventually turned into a self-fulfilling prophecy.

The Japanese did not consider how the ABCD powers would react to Tokyo’s move into southern Indochina.<sup>8</sup> Indeed, Tokyo felt that this move was possible because it believed the threat of US economic sanctions to the Japanese move to be less than 50 percent. The Japanese still moved forward, even though President Franklin D. Roosevelt had hinted to Kichisaburo Nomura, the Japanese Ambassador to the United States, that sanctions would occur if Tokyo moved troops into southern Indochina.<sup>9</sup> However, the Japanese felt that the United States would not follow through with such a move because it would provoke a war at a time when the United States was not ready to fight.<sup>10</sup>

There was some logic in the Japanese thought process. Since March 1941, the United States and Japan had been in dialogue to avoid such a war. However, as much as the United States wanted to avoid war, it would not do so at the sacrifice of basic principles of international conduct.<sup>11</sup> Therefore, reaction from the United States was swift. With the Japanese movement into southern French Indochina, the United States froze all Japanese assets on 25 July 1941.<sup>12</sup> The governments of Great Britain and the Netherlands East Indies soon followed with their own freezing actions.<sup>13</sup>

With this freezing action came a complete embargo of all oil products into Japan by these countries. It was not the intent of Roosevelt to bring about a complete embargo of oil to Japan.<sup>14</sup> He felt that such an action would cause the Japanese to invade the Netherlands East Indies and Malaya to seize the oilfields there. This would possibly suck the United States into an early conflict in the Pacific, a conflict the United States was not prepared for and which would be at the expense of devoting

## Oil Logistics in the Pacific War

Oil’s Role in Japan’s Decision for War ..... 14

Oil Available in the Netherlands East Indies ..... 16

Japan Needs a Secure Source of Oil ..... 17

Oil in the Netherlands East Indies Cannot Be Secured without US Intervention ..... 18

Pearl Harbor and the Southern Operation ..... 19

Origins of the Pearl Harbor Attack ..... 20

Securing the Eastern Flank ..... 21

Time Is Oil ..... 21

Oil, Pearl Harbor, and the US Navy ..... 22

Japanese Intelligence on the US Navy and Pearl Harbor ..... 23

The Primary Targets of the Pearl Harbor Attack Were Ships ..... 24

Drydocks, Repair Shops, and Oil Storage Areas Spared ..... 25



---

## Oil Logistics in the Pacific War

*If the Japanese could not get oil by negotiation, they would have to use force.*

energy toward the European conflict.<sup>15</sup> Roosevelt's freeze order allowed the Japanese to apply for export licenses for oil; however, hard liners within Roosevelt's administration acted as if the freeze were total, so no licenses were ever approved.<sup>16</sup>

This situation put the Japanese into a quandary; they did not gain any oil by moving into southern Indochina. Now they had isolated themselves from 90 percent of their annual requirements. The Japanese did have a strategic reserve in place that they had been building up since the early 1930s. So some time was available to try and find a diplomatic way out of the impasse.<sup>17</sup>

### **Oil in the Netherlands East Indies Cannot Be Secured without US Intervention**

Throughout the summer and into the fall of 1941, Japanese negotiators and the United States were at loggerheads. The US-led embargo would not be suspended until the Japanese stopped their militaristic expansion; indeed, Japan would have to roll back some of its gains. Included in the US demands were calls for a retreat from all French Indochina and China. This demand was unacceptable to the Japanese.<sup>18</sup> Likewise, the minimum demands of the Japanese stated that the United States must accept the current status quo in east Asia with vague promises that the Japanese would withdraw from disputed areas once peace had been established in the Far East on a fair and just basis.<sup>19</sup>

Meanwhile, Japanese oil stocks were dwindling. If the Japanese could not get oil by negotiation, they would have to use force. The nearest available source was in the Netherlands East Indies. Would it be possible to seize the oil there without involving the British and the Americans? There were numerous reasons why Tokyo felt this was not the case.

The Japanese had come into possession of British War Cabinet minutes that stated the British would fight alongside the Dutch if the Japanese invaded the Netherlands East Indies.<sup>20</sup> The Japanese were also aware that any conflict involving them and the British would draw the United States into conflict on the side of the British.<sup>21</sup> The director of the War Plans Division of the Navy Department, Admiral Richmond Kelly Turner, confided this policy to Nomura "that the United States would not tolerate, in view of its policy of aiding Britain and its interpretation of self-defense, a Japanese threat to the Malay barrier."<sup>22</sup> The United States was not limiting its interest to the British. In a note handed to Nomura from Roosevelt, the United States stated any further aggression by Japan against its neighbors and the United States would be forced "to take immediately any and all steps which it may deem necessary" to safeguard US interests.<sup>23</sup> Finally, the Japanese foreign office believed some type of military understanding had been reached among Washington, London, and Batavia. The Foreign Office produced two reports that supported its claims that a joint ABCD defense understanding existed and was being implemented.<sup>24</sup>

Even with this potential alliance arrayed against them, could the Japanese afford to dismiss the warnings as bluster? As appealing as the

thought was, the B-17s based at Clark Field and the Cavite Naval Base in Manila Bay were too much of a strategic threat to the Japanese lines of communication. Any shipments of raw materials that the Japanese might acquire in the Netherlands East Indies or Malay Barrier could potentially be attacked by US forces stationed in the Philippines. Because of this, those US forces would have to be dealt with if the Japanese could not get the resources they needed diplomatically.<sup>25</sup>

All these factors played into the Japanese belief they eventually and inevitably would come into conflict with the United States. As far back as 1909, the United States was identified as one of the principal enemies of Japan.<sup>26</sup> Indeed, the Japanese realized fairly soon after the oil embargo was imposed that the Japanese and American positions were mutually exclusive. At the 6 September 1941 Japanese Imperial Conference, materials addressing such a question were distributed to the participants.

*Is War with the United States Inevitable?*...it appears that the policy of the United States toward Japan is based upon the idea of preserving the status quo and aims, in order to dominate the world and defend democracy, to prevent our empire from rising and developing in Eastern Asia. Under these circumstances, it must be pointed out the policies of Japan and the United States are mutually inconsistent and that it is historically inevitable the conflict between the two countries, which is sometimes tense and moderate, should ultimately lead to war.

If we should ever concede one point to the United States by giving up a part of our national policy for the sake of a temporary peace, the United States, its military position strengthened, is sure to demand tens and hundreds of concessions on our part, and ultimately, our Empire will have to lie prostrate at the feet of the United States.<sup>27</sup>

It should be noted that these were not the views of one individual alone but those of the government and the supreme command of the Japanese military. If Japan were to obtain the oil and other resources it needed, it would have to control the Netherlands East Indies and the Malay Barrier. Japan also would have to remove the US threat to this plan.

## Pearl Harbor and the Southern Operation

Japanese naval strategy was built around the premise that when the United States and Japan went to war it would be a one-time decisive battle. The Japanese believed a large American fleet, as much as 40 percent larger than the Japanese fleet because of restrictions imposed by the Washington Naval Treaty, would drive across the Pacific to attack the Japanese. During this drive, the Japanese would initially send out submarines to whittle down the size of the US fleet. Closer in, the Japanese would throw land- and carrier-based aircraft into the battle. Once the reduced US fleet was far enough into the western Pacific, the Imperial Japanese Navy (IJN) would sortie out and engage in a classic ship of the line battle that the Japanese would inevitably win.<sup>28</sup>

The problem with this strategy was that it was passive. Japan would have to devote the majority of its fleet to support amphibious landings if

## Oil Logistics in the Pacific War

Pearl Harbor Was the Only Filling Station in Town .....	27
A Lack of US Oil Tankers .....	28
Oil Logistics After Pearl Harbor	30
War Comes to the US West Coast .....	31
Roll of the Drums .....	32
Unswerving Devotion to the Decisive Battle Strategy .....	33
Oil and South Pacific Ops .....	34
Conclusions .....	36

---

## Oil Logistics in the Pacific War

*With the advances the Japanese Navy made in aerial warfare, Yamamoto began contemplating an aerial strike on the fleet at Pearl Harbor.*

the Southern Operation of seizing the Netherlands East Indies and Malay Barrier were to succeed. The decisive battle plan left the initiative and time of the conflict up to the US Navy. This left Japanese forces even more at risk after the US Pacific Fleet's move to Pearl Harbor. If that fleet could be neutralized or destroyed at Pearl Harbor, it would deprive the US fleet of any initiative and allow the Japanese to run unhindered in the southern area.<sup>29</sup> This line of thought ran totally counter to 30 years of navy doctrine, and ordinarily, it would have been dismissed.<sup>30</sup> However, this proposal came from the current head of the Combined Fleet, Admiral Isoroku Yamamoto, and could not be easily brushed aside.

### Origins of the Pearl Harbor Attack

Yamamoto was opposed to conflict with America. He felt that, given the material and technological strength of the United States, Japan would have no hope of ultimate victory over America. If it came to blows though, Yamamoto would put forth every effort to ensure the goals of his homeland were achieved.<sup>31</sup> He had doubts whether the Japanese Navy could seize the vast southern areas with the majority of its forces and fend off a flank attack by the US Navy at the same time. The solution that Yamamoto came up with was to take out the Pacific Fleet with one quick action. Then the Southern Operation could proceed unmolested and new Japanese gains consolidated. Yamamoto placed heavy emphasis on aerial warfare because of an earlier posting with the air arm of the Japanese Navy. With the advances the Japanese Navy made in aerial warfare, Yamamoto began contemplating an aerial strike on the fleet at Pearl Harbor. This plan, or the Hawaii Operation as it came to be known, became the means to achieve that goal.<sup>32</sup>

Yamamoto built a planning staff to address the possible Hawaii Operation. One of the first officers tasked was Commander Minoru Genda, the man who brought forth a feasible plan for the strike. Among other things, Genda stressed the need for a surprise attack by a six-carrier task force, which would refuel at sea to make the long voyage. His plan would concentrate the IJN's aerial attack on US Navy carriers and Pearl Harbor's land-based aircraft. These targets were to be the primary ones; other strategic targets—such as the oil storage facilities, drydocks, and so on—were not mentioned at all.<sup>33</sup>

There was disagreement as to the feasibility of the Hawaii Operation from not only the Naval General Staff but also officers within the First Air Fleet staff that would be tasked to carry out the Pearl Harbor attack plan.<sup>34</sup> The plan was finally put before the Japanese Naval General Staff in wargames from 10 to 13 September 1941 at the Tokyo Naval War College. The exercise demonstrated the practicality of the Pearl Harbor attack, but it was felt by the general staff that the chance of the strike force's being detected was too high, thus putting almost all Japan's aircraft carriers at risk.<sup>35</sup> Yamamoto's staff was not deterred. They stressed Yamamoto's argument:

The present situation—*i.e.*, that of the US fleet in the Hawaiian Islands, strategically speaking—is tantamount to a dagger being pointed at our throat. Should war be declared under these circumstances, the length and breadth of our Southern Operation would immediately be exposed to a serious threat on its flank. In short, the Hawaii Operation is absolutely indispensable for successful accomplishment for the Southern Operation.<sup>36</sup>

Yamamoto's personal feelings were best summed up in a letter to a friend:

I feel, as officer in command of the fleet, that there will be little prospect of success if we employ the normal type of operations . . . . In short, my plan is one conceived in desperation . . . from lack of confidence in a perfectly safe, properly ordered frontal attack; if there is some other suitable person to take over, I am ready to withdraw, gladly and without hesitation.<sup>37</sup>

It was the same argument he used with the Naval General Staff, in a sense “my way or the highway.” No one was willing to let the commander in chief resign, so after about a month of deliberations, the plan to attack Pearl Harbor was approved.<sup>38</sup>

### Securing the Eastern Flank

Along with the Hawaii Operation, ancillary plans were drawn up to seize the US bases at Wake, Guam, and the Philippines.<sup>39</sup> Occupation of these territories would complement Japanese island holdings in the Central Pacific that were acquired after World War I. These seizures would help build an impregnable barrier against the Americans when such time arose that the US Navy would finally be able to sortie a fleet against the Japanese.

It was a strategy built on sound principles. Because of the Washington Naval Treaty's limitations, the United States was forbidden to build up any bases west of Pearl Harbor. After the Japanese withdrew from the Washington Accords,<sup>40</sup> proposals were made by a Navy board, in late 1938, to beef up its defenses west of Hawaii. However, the appropriations never made it through Congress.<sup>41</sup> Thus, if the Japanese attacked, these bases would fall relatively quickly. This would leave no US bases in the entire Pacific west of Hawaii.<sup>42</sup> Any operations planned by the Navy would have to be run out of and supported from Pearl Harbor.

*Because of the Washington Naval Treaty's limitations, the United States was forbidden to build up any bases west of Pearl Harbor.*

### Time Is Oil

The Japanese felt they had a finite amount of time in which to solve their oil problem. It was decided at the 5 November 1941 Imperial Conference that Japan would go to war with the United States (and Great Britain) if negotiations to break the diplomatic impasse were not successful by 1 December 1941. Guidance from this same meeting directed the Army and Navy to complete plans for the Hawaii and Southern Operations.<sup>43</sup>

There were many reasons this stance was adopted at the conference. First, every day the Japanese delayed the Southern Operation, ABCD forces were growing larger. For example, Army strength in Malaya and the Philippines was being reinforced at the rate of 4,000 men every month; air strength and infrastructure were also increasing. It was also feared that the



## Oil Logistics in the Pacific War

*The Japanese realized the importance of oil to their modern military machine, and any operations undertaken in the vast Pacific theater would require large amounts of it.*

ABCD powers would become closer politically, economically, and militarily in the interim.<sup>44</sup> There was also concern that the Soviet Union possibly would attack Japan in the springtime. If this occurred, the Japanese wanted to be sure the Southern Operation had been completed.<sup>45</sup> Another concern was the weather. The northeast monsoon would make the amphibious landings required in the Southern Operation increasingly difficult after December.<sup>46</sup> It also would affect ships in the Hawaii Operation. Refueling at sea was an absolute necessity for the First Air Fleet to have the range to strike Pearl Harbor. Meteorological studies showed there were only 7 days, on average, that refueling could be accomplished in December.<sup>47</sup> That number could be expected to decrease with the onset of the winter season.

However, the ultimate factor that decided the start of offensive operations was the status of the Japanese fuel stockpile. The Japanese realized that oil was the bottleneck in their fighting strength; any lengthy delay in securing an oil source would be disastrous.<sup>48</sup> Indeed, it was stated at a conference in late October 1941 that Japan needed to occupy the oilfields in the southern areas by March. If this did not occur, adding in such factors as normal stockpile depletion and getting the oilfields back into production, the Japanese would run out of oil in about 18 months.<sup>49</sup> By September 1941, Japanese reserves had dropped to 50 million barrels, and their navy alone was burning 2,900 barrels of oil every hour. The Japanese had reached a crossroads. If they did nothing, they would be out of oil and options in less than 2 years. If they chose war, there was a good chance they could lose a protracted conflict. Given the possibility of success with the second option, versus none with the first option, the Japanese chose war.<sup>50</sup>

There are many critical points of this preconflict period. The Japanese realized the importance of oil to their modern military machine, and any operations undertaken in the vast Pacific theater would require large amounts of oil. They were willing to send a huge task force of irreplaceable ships thousands of miles into hostile waters (and all the attendant oil this operation would consume) to attack a formidable enemy fleet to help achieve oil self-sufficiency.<sup>51</sup> The concurrent plan to seize the US possessions in the Central Pacific would ensure the Japanese would control all the oil-producing regions between the west coast of the United States and the Persian Gulf. Finally, there is the planning of the Pearl Harbor raid; without oil tankers, it would have been impossible for the Japanese Navy to accomplish that mission. Armed with this knowledge, would the Japanese realize this same need for oil applied to the US Navy?

### Oil, Pearl Harbor, and the US Navy

*The thing that tied the fleet to the base [Pearl Harbor] more than any one factor was the question of fuel.*

—Admiral Husband E. Kimmel  
Joint Committee on the Investigation of the Pearl Harbor Attack<sup>52</sup>

Like the Japanese, the Pacific Fleet had its own oil problems. The only major base for the US Navy in the Pacific was located in Hawaii. All major fleet logistics, repair, and storage were at the naval base at Pearl Harbor. The Navy also suffered from a severe shortage of oilers, which limited the operations radius of the fleet. The Japanese were well-informed on the strengths and logistics necessities of the Pacific Fleet. With the known vulnerabilities of the Pacific Fleet's logistics train, the Japanese, nevertheless, chose to attack military combatants only, such as the US battleships. This operational strategy was going to come back and haunt the Japanese.

### **Japanese Intelligence on the US Navy and Pearl Harbor**

Extensive intelligence gathering by the Japanese informed them of the abilities, limitations, and makeup of the Pacific Fleet and those areas and facilities required for its support. No scrap of information was too small. No scrap of information was too small. Detailed intelligence on the Pacific Fleet was the linchpin of the Hawaii Operation.<sup>53</sup>

The information received from the Japanese after the war shows that their methodical observations and espionage kept them well informed of everything concerning the defenses of Hawaii and the activities of the Pacific Fleet. In our open democratic society Japanese agents were free to observe fleet practices, take photographs with their high-powered equipment, and solicit almost any information desired . . . . High-powered binoculars were hardly necessary, but they showed particular details, which, in large measure, were unknown even to any single officer of the fleet.<sup>54</sup>

The IJN intelligence officer at Pearl Harbor was Ensign Takeo Yoshikawa. From the spring of 1941, he was in charge of intelligence gathering in Hawaii. Yoshikawa had been studying methods and operations of the Pacific Fleet for the previous 7 years.

I read a vast amount of material in that period, from obscure American newspapers to military and scientific journals devoted to my area of interest .... I studied *Jane's Fighting Ships* and *Aircraft*... devoured the *US Naval Institute Proceedings* and other US books...and magazines.... In addition to this mass of seemingly innocuous information on the Navy and its bases, I had access to the periodic reports of Japanese agents in foreign ports, particularly Singapore and Manila....

In any event, by 1940, I was the Naval General Staff's acknowledged American expert—I knew by then every US man-of-war and aircraft type by name, hull number, configuration, and technical characteristics; and I knew, too, a great deal of general information about the US naval bases at Manila, Guam, and Pearl Harbor.<sup>55</sup>

It should be noted that the ship information being collected on the west coast also included commercial traffic, especially petroleum shipments. Radio intercepts of Japanese diplomatic messages showed that in mid-

*Detailed intelligence on the  
Pacific Fleet was the  
linchpin of the Hawaii  
Operation.*

*Horrible and devastating as the Pearl Harbor raid was, it was by no means a knockout blow to the Pacific Fleet.*

1941, Japanese agents operating out of Los Angeles reported the departure of five tankers carrying 400,000 barrels of high-octane fuel to Vladivostok.<sup>56</sup>

The result was a vast intelligence tome, *The Habits, Strengths, and Defenses of the American Fleet in the Hawaiian Area*. In addition, detailed maps of Pearl Harbor were drawn up showing all the information reported above, to include the locations of fuel-storage depots.<sup>57</sup> Yamamoto and the Japanese Navy had the required information to target the Pacific Fleet at Pearl Harbor. Since the purpose of the Hawaiian Operation was to eliminate the Pacific Fleet as a threat, the question was whether Yamamoto would use this information to hit the most vulnerable center of gravity to achieve that goal.

### **The Primary Targets of the Pearl Harbor Attack Were Ships**

On the morning of 7 December 1941, there were 86 ships of the Pacific Fleet in Pearl Harbor. At the end of that day, nine of the ships were sunk or sinking, and ten others were severely damaged in the raid.<sup>58</sup>

The most important targets among the ships of the Pacific Fleet were the aircraft carriers. Intelligence indicated there would be no carriers in Pearl Harbor that morning, however, so Battleship Row on the east side of Ford Island would be the initial focal point of the raid.<sup>59</sup> The 352-plane raid<sup>60</sup> lasted from 0755, when the first bomb exploded near the seaplane ramp on Ford Island, to approximately 1000 Hawaiian time when the last Japanese planes headed north to their carriers.<sup>61</sup> By the time the raid ended, the Japanese had caused significant injury to the Pacific Fleet; eight battleships, three light cruisers, three destroyers, and four auxiliary vessels were sunk or damaged. There were also major losses among Army and Navy air forces on the island of Oahu and nearly 3,600 US casualties. The Japanese, on the other hand, lost 29 aircraft and 5 midget submarines.<sup>62</sup> Surprise, the key tenet to the success of the Hawaii Operation had been utter and complete.<sup>63</sup>

Horrible and devastating as the Pearl Harbor raid was, it was by no means a knockout blow to the Pacific Fleet. It is true that all eight battleships attacked on 7 December were either sunk or damaged. However, many factors mitigated the overall results of the attack. It is probably most important to note that the majority of sailors, less those who were killed outright in the attack or in the capsized *Oklahoma*, were easily rescued because the attack took place in a relatively small, landlocked harbor. Another factor was the physical state of the ships located on Battleship Row that morning. Professor Thomas C. Hone best stated this condition: “The American battleships were all old; several were nearly overage; most were overweight. None of the battleships in Pearl Harbor was a first-line warship in a material sense; all had recognized deficiencies.”<sup>64</sup> They were also a good 10 knots slower than the US aircraft carriers.<sup>65</sup> These details were not unknown to the hierarchy of the Pacific Fleet. When Vice Admiral William F. Halsey was asked whether or not he wanted to take

any battleships with him on his reenforcement trip to Wake Island, he retorted “Hell, no! If I have to run, I don’t want anything to interfere with my running!”<sup>66</sup> Last, but not least, because of the shallowness of Pearl Harbor, which had an average depth of only 40 feet, all but two battleships eventually would be salvaged.<sup>67</sup> The Japanese were well-aware of the depth of the harbor and the fact some ships would be salvaged. However, the Japanese felt American salvage efforts would take a lot longer than the time required to complete IJN operations in the Southern Area.<sup>68</sup>

Commander Mitsuo Fuchida, airborne leader of the Pearl Harbor attack force, verbally reported strike results to Vice Admiral Chuichi Nagumo after landing on the carrier *Akagi* following the raid:

Four battleships definitely sunk . . . One sank instantly, another capsized, the other two may have settled to the bottom of the bay and may have capsized. This seemed to please Admiral Nagumo who observed, “We may then conclude that anticipated results have been achieved.”

Discussion next centered upon the extent of damage inflicted at airfields and airbases, and I expressed my views saying, “All things considered, we have achieved a great amount of destruction, but it would be unwise to assume that we have destroyed everything. There are still many targets remaining which should be hit.”<sup>69</sup>

As far as Nagumo was concerned, though, his primary mission had been accomplished. Now his concern turned to the missing US carriers and their threat to his task force. There was no provision in the Pearl Harbor attack plan to remain in the Hawaiian area to search for US ships not at anchor at the time of attack. Nagumo, who had opposed the Hawaii Operation at its inception, was ready to withdraw. His chief of staff, Rear Admiral Jin’ichi Kusaka, had held the same opinion. Kusaka recommended to Nagumo that the fleet withdraw to Japan. Nagumo immediately concurred. A second strike on Pearl Harbor—which would have focused on the dockyards, fuel tanks, and remaining ships—was canceled.<sup>70</sup>

### **Drydocks, Repair Shops, and Oil Storage Areas Spared**

Nagumo did not realize the magnitude of his error in not completing the destruction of Pearl Harbor by attacking the base and fuel facilities. His pedantic and traditional view of naval strategy blinded him to the opportunity of a lifetime.<sup>71</sup> Never again would the Japanese Navy be in a position to deliver such a mortal blow to the US Fleet.<sup>72</sup>

Ironically, the Japanese missed their opportunity to strike at the drydocks during the initial attack. Torpedo bombers approaching from the west over Ford Island commenced their run on the battleship *Pennsylvania*. Once they came over the island, the Japanese pilots saw that it was moored in drydock No 1. Seeing this, the torpedo bombers shifted their attack runs toward a cruiser, the *USS Helena*, and the destroyer *Ogala* (actually a minesweeper).<sup>73</sup> They would have been served better by attacking the drydocks. Torpedo strikes on the drydock gates would have

*There was no provision in the Pearl Harbor attack plan to remain in the Hawaiian area to search for US ships not at anchor at the time of attack. Nagumo, who had opposed the Hawaii Operation at its inception, was ready to withdraw.*



## Oil Logistics in the Pacific War

*Had Nagumo returned with a third wave, he could have leveled the navy yard's support facilities.*

rendered these essential repair facilities inoperable until those gates were repaired or replaced. It certainly was a fear of the Navy that the Japanese would return and do just that (Figure 1). As can be seen in Figure 1, salvage operations were up and running almost immediately. The drydocks, along with the base support and repair facilities, were never targeted specifically. The only bombs that fell near these critical facilities were intended for ships on or near these facilities.<sup>74</sup> Had Nagumo returned with a third wave, he could have leveled the navy yard's support facilities,<sup>75</sup> thereby destroying the Navy's industrial capacity and setting back salvage operations.<sup>76</sup> This oversight would come back to haunt Nagumo in a most personal fashion.

The *USS Yorktown* utilized drydock No 1 after the mauling it had received on the Coral Sea. In a turnaround that can be described nothing short of miraculous, essential temporary repairs were made, and it was sent back out to sea within 72 hours for the critical Midway battle. There, its aircraft were crucial in sending all four of Nagumo's carriers to the bottom of the sea.<sup>78</sup>



Figure 1. Aerial View of Pearl Harbor Drydock, 10 December 1941. Note the improvised antitorpedo barriers located near the drydock openings. *USS Pennsylvania* and the sunken destroyers *Cassin* and *Downes* are in the lower, No 1, drydock. The *USS Helena* occupies the middle drydock. The *USS Shaw* and the sunken drydock *YFD-2* are on top. Numerous support shops and base facilities are located in the lower right corner. Also, note the black oil streaks on the harbor surface.<sup>77</sup>



**Figure 2. Submarine Base, Pearl Harbor and Adjacent Fuel Tank Farms, 13 October 1941.** This is a view of the upper oil tank farm located on the east side of the Pearl Harbor naval base. The lower tank farm was located between Hickam Field and the naval base (see Figure 1 for oil tanks in the lower farm). Note the attempts at camouflage. Two of the tanks in the foreground are painted to resemble terrain features. The third, closest to the submarine base, is painted to resemble a building.<sup>87</sup>

*By far, the most surprising target oversight of the Japanese attack was the oil and gas storage tanks.*

By far, the most surprising target oversight of the Japanese attack was the oil and gas storage tanks. The entire fuel supply for the Pacific Fleet was stored in above-ground tanks on the eastern side of the naval base (Figure 2).

As can be seen in Figure 2,, these tanks were perfectly visible to the naked eye; ergo, perfect targets.<sup>79</sup> These tanks were particularly susceptible to enemy action; none of the tanks had bombproof covers.<sup>80</sup> Even a few bombs dropped amongst the tanks could have started a raging conflagration.<sup>81</sup>

Why were these crucial targets not hit? Their loss essentially would have starved the Navy out of the Central Pacific.<sup>82</sup> Did the Japanese not know they were there?

The Japanese knew all about those oil storage tanks. Their failure to bomb the Fleet's oil supply reflected their preoccupation with tactical rather than logistical targets . . . Nagumo's mission was to destroy Kimmel's ships and the airpower on Oahu. If Yamamoto and his advisers chose the wrong targets, or insufficiently diversified ones, the mistake rests on their shoulders . . .<sup>83</sup>

## **Pearl Harbor Was the Only Filling Station in Town**

Pearl Harbor was the only refueling, replacement, and repair point for ships operating in the Hawaiian area.<sup>84</sup> Part of Pearl Harbor's duty of being the

---

## Oil Logistics in the Pacific War

*Once the Japanese seized the oilfields in the Netherlands East Indies and Burma, they eliminated all potential oil supplies in the Pacific between the Americas and the Middle East.*

Pacific Fleet's chandlery was the stocking and disbursing of oil. To that end, the Navy had just finished restocking its tanks in Pearl Harbor to their total capacity of 4.5 million barrels of oil.<sup>85</sup> The loss of this amount of oil would have effectively driven the Pacific Fleet back to the west coast and effectively knocked almost all ships of the Pacific Fleet out of contention, instead of just 19.<sup>86</sup> The Japanese knew the importance of oil to a fighting fleet; after all, they had just started a war to achieve a secure source of oil. Why did they not see that the US Fleet needed a secure source of oil if it was to operate in the vast reaches of the Pacific?

Genda later wrote that the question of demolishing the oil tanks only arose after the attack's amazing success. "That was an instance of being given an inch and asking for a mile."<sup>87</sup> He insisted that the objective of the plan was to destroy American warships so they could not interfere with the Southern Operation; oil tanks did not enter into the original idea.

As no one could charge Genda with lacking either imagination or vision, this uncharacteristic obtuseness could be due only to failure to understand the importance of logistics. Most Japanese naval planners apparently suffered from this same myopia toward the less glamorous necessities of modern warfare.

The Hawaiian Islands produced no oil; every drop had to be tanked from the mainland. Destruction of the Pacific Fleet's fuel reserves, plus the tanks in which it was stored, would have immobilized every ship based at Pearl Harbor, not just those struck on December 7 . . . "We had 4½ million barrels of oil out there, and all of it was vulnerable to .50 caliber bullets."<sup>88</sup>

The state of Allied oil supplies in the rest of the Pacific theater was extremely poor. The Japanese rapidly captured the bases at Wake and Guam in pursuit of their Southern Operation goals. This geographically isolated the Philippines and made the US naval base there untenable.<sup>89</sup> A sampling of four other ports in the Pacific highlights this problem. Brisbane had 12,000 tons of fuel available in January 1941, Sydney and Melbourne both had 8,000, and Port Moresby had none. Other bases, in the Netherlands East Indies, for example, could not be counted on for oil supplies because of their proximity to Japanese airpower and imminent Japanese invasion.

Once the Japanese seized the oilfields in the Netherlands East Indies and Burma, they eliminated all potential oil supplies in the Pacific between the Americas and the Middle East.<sup>90</sup>

For the Allies, geography had become almost as big an enemy as the Japanese.<sup>91</sup> The fuel supplies at Pearl Harbor were crucial for the Navy to bring the war to the Japanese Navy. Admiral Chester W. Nimitz summed up the situation best, "Had the Japanese destroyed the oil, it would have prolonged the war another two years."<sup>92</sup>

### A Lack of US Oil Tankers

It is interesting to note that only one ship located on Battleship Row on 7 December received no damage at all. Yet, had the Japanese sank or

severely damaged this ship, its effect on the Pacific Fleet would have been almost as great a loss as sinking an aircraft carrier. That ship was the fleet oil tanker, *USS Neosho*.<sup>93</sup>

The lack of fleet oilers, like *Neosho*, hung like a large cement albatross around the neck of Navy planners contemplating operations in the Pacific before and after the Pearl Harbor raid.<sup>94</sup> This dearth of oilers was a key vulnerability of the Navy. The Japanese Navy, who had just seen how it would have been impossible to carry out the Pearl Harbor attack without tanker support, should have targeted these ships that were so crucial to the Navy.

In the years from 1925 to 1940, the quantity of most surface combatants in the Navy had doubled in size; the size of the auxiliary force had not. Although there had been an increase in the number of fleet oilers, they were all kept busy ferrying fuel between bases.<sup>95</sup> On 7 December, the Pacific Fleet had two oilers in Pearl Harbor and three at sea and six others in ports on the west coast; only four of these were capable of at-sea refueling.<sup>96</sup> This shortage of tankers effectively limited the radius of the Pacific Fleet.<sup>97</sup> It was also a key reason so many ships were located in Pearl Harbor on 7 December. Kimmel was unable to keep less than half his fleet at sea without starting to deplete the oil reserves at Pearl Harbor; his limited supply of oilers could not keep up with the deficit.<sup>98</sup>

Because of this lack of oilers, the fleet could not have even exercised its primary war plan (even if most of its battle line was not at the bottom of Pearl Harbor). The total capacity of the Pacific Fleet's oilers was 760,000 barrels of oil. In the first 9 days after Pearl Harbor, the fleet had expended 750,000 barrels of this sum. Thus, the fleet was tied to its oil supply at Pearl Harbor,<sup>99</sup> and if the Japanese had attacked the oil storage and the associated oilers at Pearl Harbor on 7 December, they would have driven the Pacific Fleet back to the west coast.<sup>100</sup>

If the Pacific Fleet had been forced back to the west coast, would it have been effective in opposing the Japanese? The short answer is no, especially if the Japanese began targeting oilers. To give an example, the *USS Lexington* was dispatched from California to assist in the search for Amelia Earhart in July 1937. First, the *Lexington* had to top off its bunkers on the west coast.<sup>101</sup> It then proceeded on a high-speed run of about 30 knots to the Hawaiian Islands. Here, it had to refuel again from the fleet oiler *USS Ramapo* off Lahaina Roads, Maui. The result was that the *Lexington* did not arrive in the search area off Howland Island until 11 days after its departure from the west coast and could not even have done that without the support of the *Ramapo*.<sup>102</sup>

Ships *sortieing* from the west coast would be adding 2,000 nautical miles to their patrols into the Pacific just to get to Hawaii.<sup>103</sup> This number would have to be doubled, obviously, because these same ships would have to get back to the west coast if no oiler support were available and the oil storage at Pearl Harbor no longer existed.

The cruising ranges of the Pacific Fleet simply could not meet this necessity. The best range of the *Yorktown*-class carriers was 12,000 nautical

*If the Pacific Fleet were forced back to the west coast, would it have been effective in opposing the Japanese?*



---

## Oil Logistics in the Pacific War

*The number of available German submarines for these operations was even less than the Japanese deployment.*

miles at 15 knots, while older carriers had even less endurance.<sup>104</sup> Battleships had much less endurance and were slower. They averaged out at 8,000 nautical miles at 10 knots.<sup>105</sup> Cruisers were a little better off than the carriers; they averaged 14,000-14,500 nautical miles at approximately 15 knots. Destroyers, depending on their class, could go 6,000-9,000 plus nautical miles at 15 knots.<sup>106</sup> Looking at the carriers' and cruisers' endurance capabilities, the situation does not seem so bad. However, there are other factors that need to be thrown into the equation.

First, ranges needed to be decreased by a minimum of 15 percent whenever antisubmarine steering measures were taken.<sup>107</sup> Also, a prudent commander might want to avoid a suspected submarine-operating area altogether, if time and circumstances permitted such a detour. This too, would decrease overall endurance. Another factor was ship speeds. Higher speed means more fuel burned. Task force operations require much high-speed steaming for the launch and recovery of aircraft, search tasks, antisubmarine patrol, and so forth. This process, as can be seen by the previous *Lexington* example, burns a prodigious amount of fuel.<sup>108</sup>

The equation all boils down to the availability of oil and sufficient tankers to transport this precious commodity. Kimmel summed up this essential truth when he testified:

A destroyer at full power exhausts its fuel supply in 30 to 40 hours, at medium speed in 4 to 6 days. War experience has proven the necessity of fueling destroyers every third day, and heavy ships about every fifth day to keep a fighting reserve on board. To have kept the entire fleet at sea for long periods would not have required 11 tankers but approximately 75, with at least one-third of them equipped for underway delivery.<sup>109</sup>

## Oil Logistics After Pearl Harbor

The Japanese followed up their attack on Pearl Harbor with submarine operations off the west coast of the United States. These operations were planned to concentrate on striking warships versus logistical support ships and merchantmen. Although the Japanese managed to sink some ships, their submarine operations were a rather feeble effort compared to German U-boat operations against US commercial shipping in the Atlantic. The Germans committed wholesale slaughter along the east coast of the United States after Pearl Harbor. The number of available German submarines for these operations was even less than the Japanese deployment. Yet, the Germans' success was much higher because of their operational strategy of targeting Allied merchantmen, with an emphasis on oil tankers. The Japanese operational strategy of focusing only on symmetric targets, like warships, was adhered to even when asymmetric US vulnerabilities were present. This window of opportunity began to close slowly after Pearl Harbor. The Japanese lost all ability to exploit this weakness by late 1942; by then, they had lost the ability for the offensive, which was never to be recovered.

---

## War Comes to the US West Coast

## Oil Logistics in the Pacific War

Japan's geographical situation determined that war in the Pacific would be, in large measure, a war to control the sea so as to exploit its new territorial gains in the Southern Operation. One of the items in its arsenal to help accomplish this task was the submarine.<sup>110</sup>

The overall strategic mission of the Japanese submarine force was to serve as an adjunct to the main battle force. This is to say, when an enemy fleet (the US Pacific Fleet) was bearing down on Japanese waters, the IJN submarines would sortie and intercept the Americans. The Japanese subs would maintain a reconnaissance of the enemy, reporting movements to the Japanese battle fleet, while reducing the enemy force by attrition. When the two fleets met, there would be a great Jutland-style clash that would determine everything.<sup>111</sup> The Hawaii Operation's whole tenet was to nullify the need for this strategy, at least for the first 6 months. However, the submarine was too valuable a tool to be withheld from operations, so the Japanese submarine force was included in the planning of the Hawaii Operation. It would be used for prestrike reconnaissance, to attack targets that escaped the airstrike, and to interdict a counterattacking force.<sup>112</sup> Thirty large fleet boats from the Sixth Fleet were to take part in the attack. Three were to operate as a screen for the Pearl Harbor strike force, 20 others were to position themselves around Oahu, and 5 others each were to carry a two-man midget submarine. The remaining two submarines were to conduct reconnaissance around the Aleutian Islands and other US possessions in the Pacific. Following the attack, 12 of the submarines would remain in the Hawaiian area, and 9 would proceed to the US west coast.<sup>113</sup> There, they were to interdict US lines of communication by destroying enemy shipping.<sup>114</sup>

Although it was part of the original Japanese grand strategy to vigorously prosecute attacks against US commercial shipping, this was not reflected in IJN submarine operations or tactical thought.<sup>115</sup> The Japanese submarines off the west coast of the United States were primarily there to strike at US naval assets.<sup>116</sup> The Japanese hamstrung themselves with their own rules of engagement when it came to merchant traffic. They only were allowed to use one torpedo per merchant ship. Because of this, they often surfaced to engage merchant vessels with their deck guns.<sup>117</sup> This action denied them the use of two of the best weapons the submarine possessed. First, they sacrificed the relative accuracy and lethality of their primary weapon, the torpedo.<sup>118</sup> Second, this tactic sacrificed one of the submarine's greatest commodities—stealth.

Nevertheless, the Japanese submarines did score some victories on the west coast of the United States. The *I-17* damaged one freighter with shell fire and caused the tanker *Emidio* to beach itself off Crescent City, California.<sup>119</sup> The submarine *I-23* attempted a surface attack on another tanker near Monterrey, California, but achieved no hits. The tanker *Agriworld* was able to get off a distress call to the Navy. Two surface attacks by the submarine *I-21* yielded no results. However, its luck was

*Although it was part of the original Japanese grand strategy to vigorously prosecute attacks against US commercial shipping, this was not reflected in IJN submarine operations or tactical thought.*

*Doenitz' Grey Wolves fell on Allied shipping as if it was an unprotected flock of sheep.*

about to change. It torpedoed and sank the tanker *Montebello* 20 miles from Avila, California, on the morning of 23 December. Two other torpedo attacks were made farther down the coast near Los Angeles by *I-19*; one was ineffectual, the other hit the freighter *Absaroka*. With the help of a nearby Navy tug, *Absaroka* was beached right below Fort MacArthur. An order for the subs to shell west coast cities was rescinded at the last minute, and the subs withdrew to Japanese waters in late December.<sup>120</sup> This order for a premature withdrawal (the subs had hardly made a dent in their torpedo stocks) possibly was due to overconfidence on the part of the Japanese. It was decided to recall subs in the eastern Pacific to support the Southern Operation.<sup>121</sup>

A few more attacks were made on west coast targets later in 1942. One strike that had merit was an attempt to start a large forest fire with bombs dropped by a sublaunched seaplane. Unfortunately for the Japanese, unseasonable rain and fog managed to keep the fire from spreading beyond a small area, and it burned itself out.<sup>122</sup> Another attack against a California oil refinery and tank farm was motivated more personal than military strategy; in any case, that attack was also ineffectual.<sup>123</sup> From December 1941 to October 1942, Japanese submarines attacked just 19 merchant ships between Hawaii and the west coast; 15 of these were in December 1941.<sup>124</sup>

Overall, the Japanese submarine campaign on the west coast had meager results. Overconfidence, poor tactics, and a mentality that stressed commerce and logistical targets were not worthy of destruction let a golden opportunity slip through the Japanese's fingers.<sup>125</sup> Such would not be the case with their new partners one ocean over.

### Roll of the Drums

For reasons probably known only to him, Hitler declared war on the United States on 11 December 1941.<sup>126</sup> For the scope of this article, why he declared war is not important; only the immediate results of that action are reviewed here. The German Navy no longer had any constraints on attacking American shipping. Since he was given such short notice of the imminent declaration of war, Admiral Karl Doenitz, head of Germany's submarine fleet, could only muster five submarines for this first foray into US waters. Operation *Paukenschlag* (Roll of the Drums) effectively began on 12 January 1942 with the sinking of the steamer *Cyclops* by *U-123*, 300 miles off Cape Cod.<sup>127</sup> The primary targets of *Paukenschlag* were to be Allied tankers. As Doenitz summed it up, "Can anyone tell me what good tanks and trucks and airplanes are if the enemy doesn't have the fuel for them?"

Doenitz' *Grey Wolves* fell on Allied shipping as if it was an unprotected flock of sheep. The Germans were aided by the fact the Americans were not at all prepared for what was about to occur. This lack of preparedness aided the Germans, and many mistakes were made. There was no blackout on the east coast, maritime navigational aids were still operating, and ships lacked communications security discipline.<sup>128</sup> From 13 to 23 January

1942, *Paukenschlag* subs sank 25 ships.<sup>129</sup> Seventy percent of the *Paukenschlag* losses were tankers, at an average of 130,000 barrels. If this attrition rate were kept up, the Allies would lose half their tanker fleet in 1 year.<sup>130</sup> The Germans came through *Paukenschlag* without any losses; in fact, not even one German submarine was ever attacked. The American antisubmarine warfare response was pitiful. There existed no plans to deal with the possibility of a submarine assault and no forces to implement them had they existed.<sup>131</sup> This is ironic because the Atlantic Fleet received 18 destroyers in a transfer from the Pacific Fleet in May 1941.<sup>132</sup>

German submarines eventually sank 391 ships in the western Atlantic, 141 of which were tankers. One quarter of the US tanker fleet was sunk in 1942. Even though US shipyards were beginning to produce new merchant ships in record numbers, there was still a drop in overall available merchant and tanker tonnage. This came at a time when every ship was needed to help support offensives around the globe in a two-ocean war.<sup>133</sup>

### Unswerving Devotion to the Decisive Battle Strategy

“The massacre enjoyed by the U-boats along our Atlantic coast in 1942 was as much a national disaster as if saboteurs had destroyed half a dozen of our biggest war plants,” wrote Samuel Elliott Morison. Petroleum shipped from the gulf coast to east coast ports dropped fourfold from January 1942 until it began to climb in mid-1943. Tanker tonnage was woefully short.<sup>134</sup>

The Germans, to their credit, realized the importance oil played in the Allies’ war plan. As early as 3 January 1942, the Germans were urging the Japanese to concentrate their submarine efforts on a *guerre de course* strategy of commerce warfare. If the two Axis partners could concentrate their submarine efforts on Allied logistics, it would severely limit the Allies’ ability to launch any type of offensive.<sup>135</sup> The German naval attaché to Japan, Vice Admiral Paul H. Wenneker, repeatedly would urge such a change in strategy. The Japanese would listen courteously, but they were not willing to change their strategy of focusing on warships. Wenneker stated later:

The Japanese argued that merchant shipping could be easily replaced with the great American production capacity but that naval vessels represented the real power against which they fought and that these vessels and their trained crews were most difficult to replace and hence were the logical targets. If, therefore, they were to hazard their subs, it must be against the Navy.<sup>136</sup>

The Japanese remained slavishly addicted to their decisive battle doctrine. Despite the success of German U-boats off the east coast of the United States (and even their success in World War I), the Japanese would not change their strategy of using subs to support fleet operations.<sup>137</sup>

Unfortunately for the Germans and the Japanese, the Axis alliance was a political arrangement based on self-opportunistic motives. Neither the German nor the Japanese Navy considered mutual cooperation in war

*The Germans, to their credit, realized the importance oil played in the Allies’ war plan.*



---

## Oil Logistics in the Pacific War

*Fuel and tankers became so scarce in the spring of 1942 that oil was scavenged from the unsalvageable battleships still resting on the bottom of Battleship Row.*

planning a matter of much importance when Germany and Japan entered into their alliance with each other.<sup>138</sup>

The Japanese should have concentrated all their submarines off the US west coast oil ports and off Hawaii. While in these patrol areas, the subs should have systematically hunted down and destroyed US tankers and Navy oilers. The Japanese Navy also should have run a shuttle-type operation where some subs could be operating in these patrol areas at all times.<sup>139</sup> Had the Japanese followed such a strategy, there would have been much less chance that the Navy would have been able to launch any type of offensive in the Pacific in 1942.

### Oil and South Pacific Ops

During the first year of war in the Pacific, the United States Navy was forced to fight a war that it was unprepared for. It had neither enough ships, storage facilities ... nor petroleum. But with a lot of hard work, hasty improvisation, sound leadership, and some honest good luck, it managed (with great difficulty at times) to supply its fighting forces with enough fuel for combat operations. Although the supply system was strained to the breaking point, it never collapsed.<sup>140</sup>

The fuel state in the first half of 1942 was straining the logistics support system to the breaking point. As previously mentioned, shortly after Pearl Harbor, the Pacific Fleet had, for all purposes, expended almost all the fuel stored aboard its oilers. With the Pacific Fleet's oilers supplying fuel to ships in the Hawaiian area, it meant new supplies were not being brought in from the mainland. Fuel and tankers became so scarce in the spring of 1942 that oil was scavenged from the unsalvageable battleships still resting on the bottom of Battleship Row.<sup>141</sup>

The fuel and tanker shortage became an operational factor almost immediately in the Pacific. The *Neches* was part of Task Force 14 sent to relieve Wake Island in December 1941. *Neches'* slow speed (task forces could proceed only as fast as the accompanying oiler), along with some bad weather, meant the Wake Island relief force was not in position to attack Japanese forces prior to the island's being overrun.<sup>142</sup> A later, planned airstrike by the *Lexington* task force against Wake in January 1942 had to be canceled when the Japanese submarine *I-72* sank that same oiler, *Neches*.<sup>143</sup> Pacific Fleet raids on Japanese-occupied islands in January and February 1942 would have been impossible without support from Navy oilers. In a precursor of events, one carrier raiding force that had *sortied* against Rabaul was forced to retire after the Japanese had discovered it, and much fuel was used up during high-speed maneuvering while fending off Japanese air attacks. The Doolittle raid on Tokyo, which was to have immense strategic implications for the Pacific war, also would not have been possible without tanker support.<sup>144</sup>

The absence of tankers also was becoming a real concern for operations in the South Pacific in early 1942. Although it was merely a question of time before larger IJN forces overwhelmed US and Allied naval vessels during this period of the Southern Operation, the situation was aggravated

by the loss of all available ABCD oil sources in that region by mid-February 1942. The loss of the fleet oiler USS *Pecos* to Japanese action exacerbated the situation further.<sup>145</sup>

The lack of fleet oilers also was a secondary factor from the Pacific Fleet's turning from a battleship-centric navy to one formed around aircraft carrier task forces. Even after Pearl Harbor, the Navy still had a sizable battleship force. Seven battleships were available at west coast ports in late March 1942. However, since the Navy tanker shortage was so acute, there were none available for duty with this force.<sup>146</sup> This force *sortied* on 14 April 1942 to help stem the Japanese advance in the South Pacific. The battleships were loaded down with so much fuel, food, and ammunition that armored belts and decks were below the waterline. If these ships had sailed into harm's way, they would not have lasted long. Fortunately, the Coral Sea action was decided before they could participate, and the force was ordered back to the west coast.<sup>147</sup>

The oilers that could not be spared for the battleships were supporting carrier forces engaged in the Coral Sea. Again, fleet oilers were indispensable to operations. Coral Sea fueling operations were aided by the oilers *Tippecanoe* and *Neosho* (Figure 3).

The fleet oiler *Neosho* supported Task Force 17, led by Rear Admiral J. Jack Fletcher aboard the carrier *Yorktown*. This was the same *Neosho* that was so pointedly ignored by the Japanese during the Pearl Harbor raid. Although sunk by Japanese aircraft on 7 May 1942, the *Neosho* had already played its critical role in dispensing fuel oil to Task Force 14. Had Fletcher needed more fuel, the situation might have gotten a little sticky.<sup>149</sup> Ironically, the Japanese ran into their first fuel problem. A lack of tanker support for their task force, as well as a lack of fuel for its aircraft, caused the Japanese Navy to halt its task force short of its goal, Port Moresby.<sup>150</sup>

Following the miraculous success at Midway, the Pacific Fleet was finally able to go on the offensive in August 1942 with Operation Watchtower, the invasion of Guadalcanal in the Solomon Islands. Inadequate fuel logistics were still a major concern.<sup>151</sup> Fuel and support depots had been set up in Tonga and New Caledonia to support the operation, but they were 1,300 and 500 miles away, respectively, from the action on Guadalcanal.<sup>152</sup>

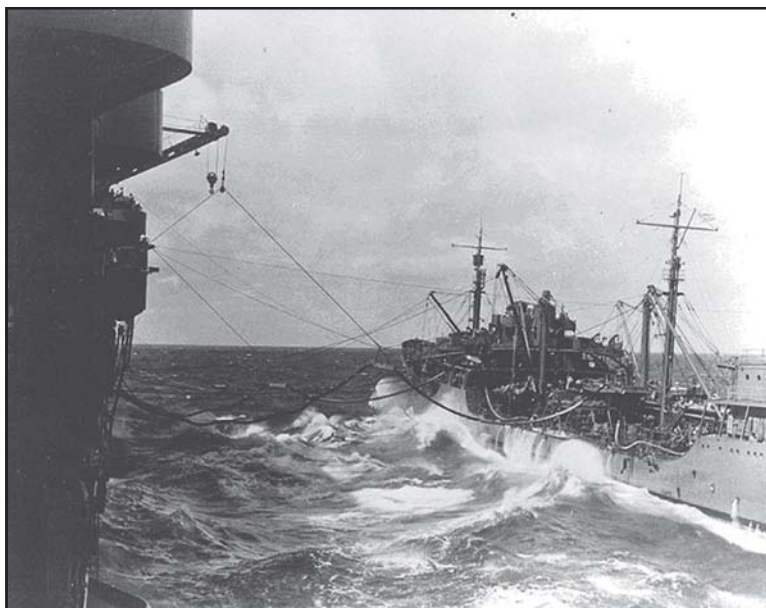
Preliminary plans to supply oil for this operation were made based on the past experience of normal operations. The officer in charge of the operation, Admiral Robert L. Ghormely, tried to factor in problems that might arise, such as unforeseen losses or changes in operations. However, his logistics staff was small and had no experience. So a supply of fuel thought to be a comfortable margin for the Guadalcanal operation turned out to be an inadequate amount.<sup>153</sup>

With such a tenuous logistics situation, Operation Watchtower became known derisively as Operation *Shoestring* by the Marines who were surviving on captured enemy rations. Inadequate fuel supplies meant the aircraft carriers covering the Marine landing forces could not stay in place and, after 2 days, withdrew 500 miles to the south to refuel. Operations

*Following the miraculous success at Midway, the Pacific Fleet was finally able to go on the offensive in August 1942 with Operation Watchtower.*

## Oil Logistics in the Pacific War

*The Japanese had lost their opportunity to strike at the key vulnerability of the United States in the Pacific—fuel logistics.*



**Figure 3. *Neosho* Refueling the *Yorktown*, Probably on 1 May 1942. *Neosho* and its escort, the destroyer *Sims*, were sunk by Japanese aircraft on 7 May 1942 after being misidentified as an aircraft carrier and a cruiser. However, by then, the *Neosho* had dispensed enough fuel to Task Force 17 for it to complete its mission of stopping the Port Moresby invasion force. Note the use of the *Yorktown* aircraft crane to support the refueling hose.<sup>148</sup>**

were touch-and-go on Guadalcanal for the next month. The US position could have been put in jeopardy by a concerted attack on fuel supplies, but this never occurred.<sup>154</sup> In September, Ghormely finally started to get a handle on his logistics requirements, with detailed fuel requests being forwarded up the chain. His actions alleviated much of the fuel problem for the rest of the South Pacific Operation.<sup>155</sup>

With the increase of fuel supplies and the inability of the Japanese to dislodge the Marine defenders on Guadalcanal, the tide had truly begun to turn in the Pacific. From this point on, the Pacific Fleet's fuel situation grew stronger, while the Japanese position grew weaker. The Japanese had lost their opportunity to strike at the key vulnerability of the United States in the Pacific—fuel logistics.

## Conclusions

*God was on the side of the nation that had the oil.*

—Professor Wakimura  
Tokyo Imperial University in Postwar Interrogation<sup>156</sup>

The IJN's devotion to an outdated operational strategy, rather than focusing on what effects needed to ensure their national strategy was met, proved to be their downfall. The Japanese knew that if they did not find

a secure and stable source of oil they eventually would have had to comply with US prewar demands. Once it was realized that diplomatic measures would be ineffective, the Japanese plan was to seize and secure as much oil and other resources as possible. The raid at Pearl Harbor was but a branch to achieve that overall goal.

As effective as Japanese intelligence and initial military actions were, they never were focused on the destruction of the key target that might have let them achieve their goal of keeping the Navy out of the Pacific. The Japanese strategic disregard of the fragile US oil infrastructure in the Pacific was an incredible oversight on their part. The Japanese should have attacked the US oil supply at Pearl Harbor and followed up that raid with attacks on US oilers and tankers in the Pacific. Japanese attacks, in conjunction with German strikes, on the oil supply and infrastructure would have bought the Japanese much valuable time—time that could have been used consolidating gains in its newly won territories, time that might have allowed Japan to build up such a defensive perimeter that the cost of an Allied victory might have been too high.

The Japanese were not the first to ignore the importance and vulnerability of logistics. As long ago as 1187, history shows that logistics played a key part in the Muslim's victory over the Crusaders at the Battle of Hittin. The Muslim commander Saladin captured the only water source on the battlefield and denied its use to the Crusaders. The loss of water severely demoralized and debilitated the Crusaders, contributing to their defeat and eventual expulsion from the Holy Land.<sup>157</sup>

The vulnerability and importance of logistics remains evident today. The terrorist bombing of the destroyer *USS Cole* occurred while it was in port, fueling, at Aden, Yemen, on 12 October 2000. Had it not required fueling, the *USS Cole* would not have put in at Aden, 17 sailors would not have been killed, and the Navy would no temporarily have lost a valuable maritime asset.<sup>158</sup> There is an old saying, "Amateurs talk strategy, and professionals talk logistics." Commanders and their staffs must remember the importance of logistics to achieving the overall goal, for friendly forces as well as the enemy.

*The vulnerability and  
importance of logistics  
remains evident today.*

#### Notes

1. Kent Roberts Greenfield, ed, *Command Decisions*, Washington DC: Office of the Chief of Military History, Department of the Army, 1960, 100-101.
2. Military History Section, Headquarters, Army Forces Far East, Japanese Monograph No 147, *Political Strategy Prior to Outbreak of War, Part III*, Washington: Office of the Chief of Military History, Department of the Army, 1947, 12-13. For a chronological record of these and other events leading up to World War II, see Congress of the United States, *Events Leading Up to World War II*, Washington: US Government Printing Office, 1944.
3. Herbert Feis, *The Road to Pearl Harbor*, Princeton, New Jersey: Princeton University Press, 1950, 207.
4. Feis, 206.
5. *Japanese Monograph No 147*, 25.
6. Akira Iriye, *Pearl Harbor and the Coming of the Pacific War*, Boston: Bedford/St Martin's, 1999, 134. The ABCD powers were defined as the American, British, Chinese, and Dutch governments.



---

## Oil Logistics in the Pacific War

7. *Japanese Monograph No 147*, 28-33.
8. Iriye, 134.
9. *Japanese Monograph No 147*, 42-43.
10. Iriye, 136.
11. Eric Larrabee, *Commander in Chief*, New York: Harper & Row, 1987, 46.
12. *Papers Relating to the Foreign Relations of the United States, Japan: 1931-1941*, Vol II, Washington: United States Government Printing Office, 1943, 266.
13. Iriye, 145.
14. Robert Goralski and Russell W. Freeburg, *Oil and War*, New York: William Morrow and Co, 1987, 101.
15. *Foreign Relations of the United States. Diplomatic Papers, 1941, Vol IV, The Far East*, Washington: United States Government Printing Office, 1956, 840.
16. Goralski, 101.
17. Feis, 268.
18. Nobutaka Ike, *The International Political Roots of Pearl Harbor: The United States-Japanese Dyad, Translations of the Records of the Liaison Conferences 19 through 75; and Four Imperial Conferences*, report to Dr Thomas W. Milburn, Behavioral Sciences Group, China Lake, California: United States Naval Ordnance Test Station, 30 Mar 64-15 Jun 65, 16-17.
19. *Japanese Monograph N, 147*, 46-48.
20. Iriye, 128.
21. *Papers Relating to the Foreign Relations of the United States, Japan: 1931-1941*, Vol II, 137-143. In this correspondence, the Counselor of the US Embassy in Tokyo related to the Japanese Vice Minister for Foreign Affairs that any nation that was to prejudice British lines of communication could expect to come into conflict with the United States. When asked by the Japanese minister that if the Japanese attacked Singapore there would be war with the United States, the counselor replied that the situation would "inevitably raise that question." The US Ambassador, Joseph Grew, later confirmed this position to the Japanese Prime Minister.
22. Congress of the United States, Hearings before the Joint Committee on the Investigation of the Pearl Harbor Attack, Part 6, Washington: US Government Printing Office, 1946, 2866.
23. *Papers Relating to the Foreign Relations of the United States, Japan: 1931-1941*, Vol II, 556-557. It is interesting to note that, although these were rather explicit warnings sent by Roosevelt to the Japanese, Roosevelt himself questioned whether the United States had the political will to back them up. When asked by the Chief of Naval Operations, Adm H. R. Stark, what the US response would be in the event of an attack on British possessions in the Far East, Roosevelt responded, "Don't ask me these questions." See *Investigation of the Pearl Harbor Attack, Part 5*, 2231-2232.
24. Feis, 190.
25. Kent Roberts Greenfield, ed, *Command Decisions*, 106; also see Larrabee, 91.
26. Military History Section, Headquarters, Army Forces Far East, *Japanese Monograph No 150, Political Strategy Prior to Outbreak of War Part IV*, Washington: Office of the Chief of Military History, Department of the Army, 1947, 1.
27. Nobutaka Ike, *The International Political Roots of Pearl Harbor*, Imperial Conference, 6 Sep 41, 33-34.
28. John Buckley, *Air Power in the Age of Total War*, Bloomington, Indiana: Indiana University Press, 1999, 95.
29. Dr David C. Evans, *The Japanese Navy in World War II*, 2<sup>d</sup> ed, Annapolis Maryland: Naval Institute Press, 1986, 8-9.
30. Hiroyuki Agawa, *The Reluctant Admiral*, New York: Kodansha International, 1979, 197-198. The author relates two stories: one that shows how independent operational thought that ran counter to naval general staff policy was frowned upon. He also relates an incident during fleet map maneuvers that showed minor trivialities, such as logistics, could be discounted if overall results were negative to the desired outcome.

31. Gordon W. Prange, *At Dawn We Slept: The Untold Story of Pearl Harbor*, New York: McGraw-Hill, 1986, 10.
32. Prange, *At Dawn We Slept*, 12-14.
33. Prange, *At Dawn We Slept*, 20-28.
34. Shigeru Fukudome, "Hawaii Operation," *US Naval Institute Proceedings*, Dec 55, 1318. It is interesting to note that the two men who were to carry out the tactical part of the plan at Pearl Harbor—Nagumo and his chief of staff, Rear Adm Ryunosuke Kusaka—felt that the Hawaii Operation was too risky, and this apprehension stayed with them throughout the planning and execution of the attack. See also Agawa, 263-264.
35. *Command Decisions*, 109.
36. Fukudome, 1320.
37. Agawa, 235. This letter was written after the Naval General Staff approved the Pearl Harbor attack plan.
38. *Ibid.*
39. Military History Section, Headquarters, Army Forces Far East, Japanese Monograph No 152, *Political Strategy Prior to Outbreak of War, Part V*, Washington: Office of the Chief of Military History, Department of the Army, 1947, 50-51.
40. *Events Leading up to World War II*, 54.
41. Senator David I. Walsh, *The Decline and Renaissance of the Navy 1922-1944*, Washington: US Government Printing Office, 1944, 4-7.
42. Arthur Zich, *The Rising Sun*, Alexandria, Virginia: Time-Life Books, 1977, 87 and 89-97. When the Japanese attacked Guam on 10 Dec 41, the garrison of a little more than 425 men surrendered in less than 1 day. When attempts were made to increase the defenses of Wake and the Philippines in the second half of 1941, it was too little, too late. Wake fell on 23 Dec 41. Although the Philippines took longer to conquer (the Americans didn't formally surrender until 6 May 42), their demise was a forgone conclusion. The United States could not relieve the Philippines because there were no reinforcements available and no way to protect them even if they were.
43. The International Political Roots of Pearl Harbor, Imperial Conference, 5 Nov 41, 22-23.
44. *Japanese Monograph No 150*, 87-88.
45. *Japanese Monograph No 147*, 15.
46. Ronald Spector, *Eagle Against the Sun*, New York: The Free Press, 1985, 83.
47. Fukudome, 1319.
48. *The International Political Roots of Pearl Harbor*, Imperial Conference, 6 Sep 41, 37.
49. *Japanese Monograph No 150*, 20.
50. Goralski, 102.
51. Gordon W. Prange with Donald M. Goldstein, and Katherine V. Dillon, *Pearl Harbor: The Verdict of History*, New York: McGraw-Hill, 1986, 490.
52. *Investigation of the Pearl Harbor Attack, Part 6*, 2569.
53. Prange, *Pearl Harbor: The Verdict of History*, 482.
54. Homer N. Wallin, *Pearl Harbor: Why, How, Fleet Salvage and Final Appraisal*, Washington: Naval History Division, 1968, 60.
55. Takeo Yoshikawa and Norman Stanford, "Top Secret Assignment," *US Naval Institute Proceedings*, Dec 60, 27-29 and 33.
56. Goralski, 85.
57. John Costello, *The Pacific War*, New York: Quill, 1982, 84.
58. Homer N. Wallin, "Rejuvenation at Pearl Harbor," *US Naval Institute Proceedings*, Dec 46, 1521-1523. This total includes the floating drydock, YFD-2. It is also important to note that there were many ships of the Pacific Fleet that were not in Pearl Harbor that Sunday. For example, the carriers *Enterprise* and *Lexington* were ferrying USMC aircraft to Wake and Midway Islands in anticipation of war starting in the Pacific. Numerous other ships were patrolling in the Pacific or were in ports on the west coast.

59. Prange, *At Dawn We Slept*, 25 and 374. An interesting note of controversy exists over the primacy of battleships versus aircraft carriers as the primary targets of the Pearl Harbor raid. Genda had been pushing for carriers as the primary targets since Feb 41. Testimony made by Capt Mitsuo Fuchida during his interview with the US Strategic Bombing Survey team backs up Genda's statement (see *United States Strategic Bombing Survey* [Pacific], Interrogations of Japanese Officials, No 72, Vol I, 122. However, those statements do not jibe with "Carrier Striking Task Force Operations Order No 3" sent to the Pearl Harbor attack force on 23 Nov 41 (see Japanese Monograph No 97, *Pearl Harbor Operations: General Outline and Orders and Plans*, 14). In this order, Yamamoto specifies that both battleships and carriers will be attacked but battleships will be the priority targets for the first wave of attacking aircraft. Carriers were the priority of the second wave. Although the Japanese knew there were not any carriers in Pearl Harbor as of 6 Dec, there was a chance that one or more might return that night. "If that happens," said Genda, "I don't care if all eight of the battleships are away." "As an airman," remarked Oishi (Nagumo's senior staff officer), "you naturally place much importance on carriers. Of course, it would be good if we could get three of them, but I think it would be better if we get all eight of the battleships." (See Mitsuo Fuchida, "I Led the Air Attack on Pearl Harbor," *US Naval Institute Proceedings*, Sep 52, 944). Since no carriers did come into Pearl Harbor during the night of 6-7 Dec, the point is moot. However, it does give insight to the prioritization of potential targets in the eyes of the IJN leadership. It also gives pause to wonder what those Japanese airmen would have targeted first if the carriers had been in Pearl Harbor.
60. Fuchida, 945 and 951.
61. Prange, *At Dawn We Slept*, 506 and 538.
62. Prange, *At Dawn We Slept*, 539-540.
63. Prange, *At Dawn We Slept*, 25 and 503-504.
64. Prange, *Pearl Harbor: The Verdict of History*, 537.
65. Spector, 147.
66. Prange, *At Dawn We Slept*, 401.
67. Wallin, "Rejuvenation at Pearl Harbor," 1521. In addition, the target battleship *Utah* was not raised because of her age and the time and effort salvage would entail. Although she tends to be overshadowed by the memorial of her sister ship *Arizona* and the USS *Missouri* floating museum, a small monument to the *Utah* and the 58 men still entombed can be found on the west-northwest shore of Ford Island behind a family housing area. See also E. B. Potter, ed, *Sea Power—A Naval History*, Englewood Cliffs, New Jersey: Prentice-Hall, 1960, 651, for information on the *Arizona* and *Oklahoma*. Also, because of the shallow depth of the harbor, the Japanese had worked feverishly to develop a torpedo that would not dive to 60 feet before leveling out. By the addition of wooden stabilizers, they only were able to solve this problem in Oct 41 (see Prange, *At Dawn We Slept*, 160 and 321).
68. Prange, *At Dawn We Slept*, 374. The Japanese Ambassador to the United States, Nomura, who had no fore knowledge of the Pearl Harbor attack, saw this as a key tactical flaw in the Hawaii Operation (see Prange, *Pearl Harbor: The Verdict of History*, 538).
69. Fuchida, 952.
70. Prange, *At Dawn We Slept*, 542-545.
71. Prange, *At Dawn We Slept*, 545.
72. Evans, 40.
73. Fuchida, 950. See also Wallin, *Pearl Harbor: Why, How, Fleet Salvage and Final Appraisal*, 141.
74. Wallin, "Rejuvenation at Pearl Harbor," 1524.
75. In defense of Nagumo, machine and repair tools were notoriously hard to destroy. Industrial plants targeted by the US Army Air Forces in Europe would be destroyed, but the machine tools inside the buildings showed more durability. See the *United States Strategic Bombing Survey*, Maxwell AFB, Alabama: Air University Press, 1987, 15, 17-18.

76. Wallin, *Pearl Harbor: Why, How, Fleet Salvage and Final Appraisal*, 175. The salvage and repair operations at Pearl Harbor were nothing short of Herculean. A short summary will show the reader how quickly some temporary repairs were made. The *Pennsylvania* sailed to the west coast 2 weeks after the attack. The *Maryland* and *Tennessee* were ready for combat the same day. The destroyer *Shaw*, whose bow was blown off in a spectacular explosion, left for California under her own steam on 9 Feb 42. The *Nevada*, which Nimitz doubted would ever sail again, was in drydock by mid-February and en route to the west coast by mid-April (see Prange, *Pearl Harbor: The Verdict of History*, 538-539).
77. Naval Historical Center, Department of the Navy, Various photographs, 40-41. [Online] Available: <http://www.history.navy.mil/photos/images>, Feb 01. Drydock photos [Online] Available: <http://www.history.navy.mil/photos/images/g380000/g387598c.htm>.
78. Robert Cressman, *That Gallant Ship USS Yorktown CV-5*, Missoula, Montana: Pictorial Histories Publishing Co, 1985, 115, 117, and 118. To be filed under the heading of ironic justice, all four carriers had participated in the Pearl Harbor attack; see Gordon W. Prange's *Miracle at Midway*, New York: McGraw-Hill, 1982, for an excellent review of that conflict.
79. *Investigation of the Pearl Harbor Attack, Part 6*, 2570. The upper tank farm was clearly visible next to the southeast loch of Pearl Harbor as Figure 2 shows. The lower tank farm was next to the Hickam Field water tower, an approximate 150-foot high obelisk, that was visible from up to 5 miles away (see *Investigation of the Pearl Harbor Attack, Part 38*, Item 117).
80. *Investigation of the Pearl Harbor Attack, Part 6*, 2812.
81. Wallin, "Rejuvenation at Pearl Harbor," 1524. The Navy realized the vulnerability of the oil supply and was in the process of building some underground storage tanks; however, these would not be completed until late 1942 (Gunter Bischof and Robert L. Dupont, ed, *The Pacific War Revisited*, Baton Rouge, Louisiana: Louisiana State University Press, 1997). There was to be a total of 15 underground tanks (100 feet wide by 285 feet high) with a storage capacity of approximately 4.5 million barrels, the same amount as the above-ground tanks. See *Investigation of the Pearl Harbor Attack, Part 23*, 966. Also see William M. Powers, "Pearl Harbor Today," *US Naval Institute Proceedings*, Dec 81, 52.
82. Prange, *Miracle at Midway*, 4.
83. Prange, *Pearl Harbor: The Verdict of History*, 485.
84. *Investigation of the Pearl Harbor Attack, Part 6*, 2506.
85. Goralski, 154. It should be noted that there are several discrepancies in the total amount of fuel in storage and total capacity available at Pearl Harbor on 7 Dec 41. Kimmel testified that there were 4 million gallons in storage (see *Investigation of the Pearl Harbor Attack, Part 6*, 2812). Adm Claude C. Bloch, commander of the 14<sup>th</sup> Naval District at the time of the attack, testified to the Hart Commission that there were approximately 4 million barrels in storage that morning (*Investigation of the Pearl Harbor Attack, Part 26*, 101). Goralski states that there were 4.5 million barrels stored. Since the purpose of the inquiries following the Pearl Harbor attack were to find out why the US Armed Forces on Hawaii were caught unawares and Goralski's work is more focused on the role of oil in war, his numbers will be used.
86. *Investigation of the Pearl Harbor Attack, Part 6*, 2570.
87. Photos [Online] Available: <http://www.history.navy.mil/photos/images/g100000/g182880c.htm>. The earthen berms located between the tanks were used to contain potential oil spills.
88. Prange, *Pearl Harbor: The Verdict of History*, 509-510. The quote at the end is from Nimitz.
89. Duncan S. Ballantine, *US Naval Logistics in the Second World War*, Newport, Rhode Island, Naval War College Press, 1998, 39. Japanese aircraft destroyed the Cavite naval base on 10 Dec 41 (see *Dictionary of American Naval Fighting Ships*, Vol VII, Washington: Naval Historical Center, Department of the Navy, 1981, 282).



---

## Oil Logistics in the Pacific War

90. Bischof and Dupont, 61-62.
91. Bischof and Dupont, 43. By Mar 42, at least one navy tanker was sent to Abadan, Iran, to get oil to support operations in the South Pacific (see *Dictionary of American Naval Fighting Ships*, Vol VII, 282).
92. Prange, *Pearl Harbor: The Verdict of History*, 510.
93. Wallin, *Pearl Harbor: Why, How, Fleet Salvage and Final Appraisal*, 103-104. Also see Commanding Officer *USS Neosho*, "Report on Raid on Pearl Harbor, T. H., 7 Dec 41 [Online] Available: <http://www.ibiblio.org/hyperwar/USN/ships/logs/AO/ao23-Pearl.html>, 5 Mar 01.
94. Bischof and Dupont, 57. The Navy classified its oil tankers as fleet oilers. For the purposes of this article, Navy oilers is synonymous with tanker or oil tanker.
95. Ballantine, 4.
96. *Investigation of the Pearl Harbor Attack, Part 6*, 2504. Also see *Investigation of the Pearl Harbor Attack, Part 12*, 345-346. In addition, there were two other oilers in the Cavite Navy Yard the morning of the Pearl Harbor attack; they were attached to US Asiatic Fleet (see *Dictionary of American Naval Fighting Ships*, Vol VII, 282).
97. Prange, *Pearl Harbor: The Verdict of History*, 547.
98. *Investigation of the Pearl Harbor Attack, Part 6*, 2504, 2569, and 2732.
99. *Investigation of the Pearl Harbor Attack, Part 32*, 593.
100. *Investigation of the Pearl Harbor Attack, Part 6*, 2570. The Japanese knew the oilers were in Pearl Harbor; the Japanese consulate kept them informed on all ship arrivals and departures (see Fuchida, 943). The Japanese attack force made a conscious decision to not attack the *Neosho*. She was berthed at the F-4 fueling dock at Ford Island. In their planning, the Japanese had a torpedo bomber of the initial strike force tasked against the ship in this berth (torpedo track 3); the *Neosho* was not torpedoed. Later, when the *Neosho* was backing up the East Loch of the harbor, she was purposefully not attacked by a Japanese bomber who held its fire in order to strike the battleship *Nevada*. Strangely, the oiler at the F-4 berth was marked as sunk in Fuchida's post battle report (see Prange, *At Dawn We Slept*, 385, 512, 518, and 536). The Japanese were also aware that there were two oilers at Cavite; they even knew their names (see *Investigation of the Pearl Harbor Attack, Part 12*, 302-303). It is also a fair assumption that the Japanese knew the locations of the other oilers that were in port on the west coast on 7 Dec 41.
101. B. Orchard Lisle, "The Case for Aircraft-Carrying Oil Tankers," *US Naval Institute Proceedings*, Nov 42, 1555. There is debate on where Lexington departed from on the west coast, but there was a delay in her departure. Given the desire among naval officers to have as much fuel in their bunkers as possible, with time available to the *Lexington* prior to her departure from the west coast, it is assumed she topped off her fuel bunkers.
102. Susan Butler, *East to the Dawn*, Reading, Massachusetts: Addison-Wesley, 1997, 414. Also see Elgen M. Long and Marie K. Long, *Amelia Earhart*, New York: Simon & Schuster, 1999, 220. Ironically, the *USS Ramapo* was the other oiler at Pearl Harbor the morning of 7 Dec 41 (see *Investigation of the Pearl Harbor Attack, Part 12*, 348-349); also see Commanding Officer *USS Ramapo*, "Report on Raid on Pearl Harbor," 7 Dec 41 [Online] Available: <http://www.ibiblio.org/hyperwar/USN/ships/logs/AO/ao12-Pearl.html>, 5 Mar 01.
103. Ballantine, 40.
104. Roger Chesnau, *Aircraft Carriers of the World, 1914 to the Present*, Annapolis, Maryland: Naval Institute Press, 1984, 201, 205, and 206.
105. Ian Sturton, ed, *Conway's All the World's Battleships 1906 to the Present*, Annapolis, Maryland: Naval Institute Press, 1987, 160, 164, 168, 172, and 176.
106. James C. Fahey, *The Ships and Aircraft of the US Fleet*, New York: Ships and Aircraft, 1945, 15, 18, 23-25.
107. "The Zig-Zag Course as a Defence Against Submarines," *US Naval Institute Proceedings*, Professional Notes, Aug 17, 1836. Although a dated article, this technique, which was a proven defense at the end of World War I, could be expected to be used at the start of World War II.

108. Bischof, 70.
109. *Investigation of the Pearl Harbor Attack, Part 6*, 2504.
110. *Strategic Bombing Survey*, 108.
111. Norman Polmar and Dorr Carpenter, *Submarines of the Imperial Japanese Navy*, Annapolis, Maryland: Naval Institute Press, 1986, 1.
112. Polmar and Carpenter, 12-13. Also see Potter, 796.
113. Polmar and Carpenter, 13-14. The midget submarines were to attack US warships in Pearl Harbor in conjunction with the air raid. Following the attack, none of the five midget submarines ever made it back to the mother ship.
114. Military History Section, Headquarters, Army Forces Far East, *Japanese Monograph No 108, Submarine Operations in the First Phase Operations, December 1941 to April 1942*, Washington: Office of the Chief of Military History, Department of the Army, 1947, 1.
115. Japanese Monograph N. 150, *Political Strategy Prior to Outbreak of War, Part IV*, 47.
116. Polmar, 11. The prewar strategy of the primary role of fleet attack remained unchanged until Apr 42. After this point, submarines switched to commercial shipping; however, most of these attacks seemed to concentrate in the Indian Ocean area, which had minimal effect on Pacific Fleet operations.
117. Donald J. Young, "For a week in December 1941, Japanese submarines prowled the Pacific coastline, searching for merchant ships to sink," *World War II*, Jul 98.
118. William Scheck, "Japanese submarine commander Kozo Nishino gained personal satisfaction from shelling the California coast." *World War II*, Jul 98, 18. Among other items, the article mentions the difficulty of keeping the submarine deck gun trained on targets while the submarine was constantly moving. Also the Japanese torpedo, a 24-inch, oxygen-driven weapon, had characteristics that more than doubled the nearest US model (see Prange, *At Dawn We Slept*, 394).
119. Young, "For a week in December 1941, Japanese submarines prowled the Pacific coastline, searching for merchant ships to sink," 27-29. It should be noted that the *I-17* attempted to shell the *Emidio* first, and the tanker was able to send out a distress call. Responding aircraft were able to drop depth charges on the sub—twice. Although the sub suffered no damage, the surface attack shows the increased risk the Japanese took.
120. Young, 29-32.
121. Carl Boyd and Akihiko Yoshida, *The Japanese Submarine Force and World War II*, Annapolis, Maryland: Naval Institute Press, 1995, 68-69.
122. William H. Langenberg, "A floatplane launched from an Imperial Japanese Navy submarine dropped its bombs in September 1942—the first time the continental United States was bombed from the air." [Online] Available: [http://www.thehistorynetcom/AviationHistory/articles/1998/11982\\_text.htm](http://www.thehistorynetcom/AviationHistory/articles/1998/11982_text.htm), 7 Mar 01.
123. Scheck, "Japanese submarine commander Kozo Nishino gained personal satisfaction from shelling California coast," 16-18. The sub commander Kozo Nishino had visited the refinery during the prewar period as the commander of a Japanese tanker. In a welcoming ceremony, he slipped on some oil and ended up in a cactus patch, much to the amusement of local refinery workers. Nishino, insulted by the laughter, saw his chance to get revenge in Feb 42. He peppered away at the refinery for 45 minutes with his 5.5-inch gun. He did not cause any significant damage, but apparently, it was enough to settle a personal score.
124. Juergen Rohwer, *Axis Submarine Successes 1939-1945*, Annapolis, Maryland: Naval Institute Press, 1983, 278-281.
125. Potter, 799.
126. *Events Leading up to World War II*, 310.
127. Ladilas Farago, *The Tenth Fleet*, New York: Ivan Oblensky Inc, 1962, 46-47, 55.
128. Goralski, 103-104.
129. Farago, 58. Estimates range from 25 to 44 ships sunk, depending on the source. It should also be noted that the Germans sank 74 ships within 300 miles of the American coast in Mar 42 alone; again, a high proportion of these were tankers. Losses were so bad that if the rate continued there would not be enough fuel to carry on the war (see also Goralski, 106-112).

---

## Oil Logistics in the Pacific War

130. Goralski, 106.
131. Farago, 58.
132. *Investigation of the Pearl Harbor Attack, Part 6*, 2505. The destroyers (along with other ships transferred) were to be used in neutrality patrols to keep German naval forces out of the western Atlantic.
133. Goralski, 116.
134. Goralski, 109-111. The tanker shortage became so acute that some Liberty-type dry cargo ships were converted into tankers with most being delivered in 1943 (see L. A. Sawyer and W. H. Mitchell, *The Liberty Ships*, Cambridge, Maryland: Cornell Maritime Press, 1970, 161).
135. *International Military Tribunal for the Far East*, Vol 256, Tokyo, Japan, 1 Dec 47, 34257.
136. Goralski, 186-188.
137. Potter, 796.
138. John W. Masland, "Japanese-German Naval Collaboration in World War II," *US Naval Institute Proceedings*, Feb 49, 179 and 182.
139. Boyd and Yoshida, 189-190.
140. Bischof and Dupont, 78.
141. Wallin, "Rejuvenation at Pearl Harbor," 1545. About 1 million gallons of oil were recovered from the *Oklahoma* alone.
142. Bischof and Dupont, 66.
143. Bischof and Dupont, 77.
144. Worrall R Carter, *Beans, Bullets, and Black Oil*, Newport, Rhode Island: Naval War College Press, 1998, 17-20. The raid was a boost for American morale after a steady diet of defeat. It also confirmed to Yamamoto the need for the upcoming Midway operation, where the defeat of the Japanese Navy later proved to be the turning point in the Pacific war (see Prange, *Miracle at Midway*, 24-27).
145. Carter, 15-16. The *Pecos* was attempting to join her sister ship *Trinity* in the Persian Gulf when she was sunk. The oil situation became so critical that the Australian cruiser *Hobart* could not participate in the Java Sea battle on 27 Feb 42 because of a lack of fuel. Another factor in fueling operations was the excruciating pace of refueling operations. The 1938 standard tanker could pump only 200 tons of fuel per hour. The newer T-2 tankers could pump approximately 700 tons an hour. At the end of 1941, the Navy only possessed six of these T-2 types (Cimarron class) with four in the Pacific Fleet (see Lane C. Kendall, "Tanker Operation and Management," *US Naval Institute Proceedings*, Apr 57, 425. Also see Fahey, 48).
146. Spector, 158 and 168.
147. Carter, 11.
148. Photos [Online] Available: <http://www.history.navy.mil/photos/images/g460000/g464653c.htm>. Also see Carter, 20-21, and see Zich, 69.
149. Carter, 21.
150. Goralski, 156. This was the first time the Japanese were to run into a fuel supply problem. It was an awful portent of the IJN's future operations.
151. George C. Dyer, *The Amphibians Came to Conquer: The Story of Admiral Richmond Kelly Turner*, Washington: US Government Printing Office, 1972, 311-312.
152. Carter, 21, 23-24.
153. Carter, 24-25.
154. Goralski, 157. Japanese bombing and naval gunfire came close to putting the US airstrip Henderson Field out of action when critical fuel supplies were destroyed. Another time, the arrival of four tankers was said to have turned the battle, "If they hadn't arrived when they did, we wouldn't have Guadalcanal" said Ghormely.
155. Carter, 28, 30, and 32.
156. Goralski, 304.
157. Gerard Chaliand, ed, *The Art of War in World History*, Los Angeles, California: University of California Press, 1994, 400-404.
158. Speaker remarks and press coverage. Lecture to AY 01 students and faculty, Air Command and Staff College, Maxwell AFB, Alabama, 15 Mar 01.

## Lieutenant General Lewis H. Brereton

Brereton was born in Pittsburgh, Pennsylvania, in 1890. He attended St John's College, Annapolis, Maryland, and graduated from the US Naval Academy in 1911.

He resigned as an ensign and was appointed a second lieutenant in the Coast Artillery Corps of the Regular Army on 17 August 1911. He was detailed to the Aviation Section, Signal Corps, and received flying training at the Signal Corps Aviation School, qualifying as a military aviator on 27 March 1913.



During the *Great War*, he commanded the 12<sup>th</sup> Aero Squadron, one of the first American flying units on the front. He carried out extensive operations in both the Toul and Luneville sectors, took part in the attack at Vaux in July 1918, and became chief of aviation, First Army Corps. He took command of the Corps Observation Wing immediately preceding the St Mihiel operations and became operations officer on the staff of the chief of Air Service of the American Expeditionary Forces. He continued in this capacity until the cessation of hostilities, when he was appointed chief of staff, Headquarters Air Service of the Third Army.

He rose steadily through the ranks in the years between World War I and World War II. When the war broke out in December 1941, he was commander of the Far East Air Forces, based in the Philippines. What had been described as a breakdown in communications with MacArthur's Headquarters enabled the enemy to catch Brereton's Luzon-based B-17s on the ground, and the bulk of his force was destroyed. When that command collapsed a few months later, he was sent to India to command the Tenth Air Force.

Achieving the rank of lieutenant general in April 1944, he commanded the Ninth when it raided Ploesti, Romania, and remained with it until he took over the 1st Allied Airborne Army. He served in the European theater until the capitulation of Germany. Throughout the war, he was a key figure in several important events, including the fall of Burma, the British success at El Alamein, D-day, and a *bridge too far* at Arnheim.

After the war, he was a senior military advisor to the Atomic Energy Commission until his retirement in September 1948. Brereton died 1 August 1967.

[Online] Available: <http://earlybirds.org/brereton.html>; <http://www.af.mil/bios/bio.asp?bioid=4788>; and <http://www.airpower.maxwell.af.mil/airchronicles/cc/brere.html>

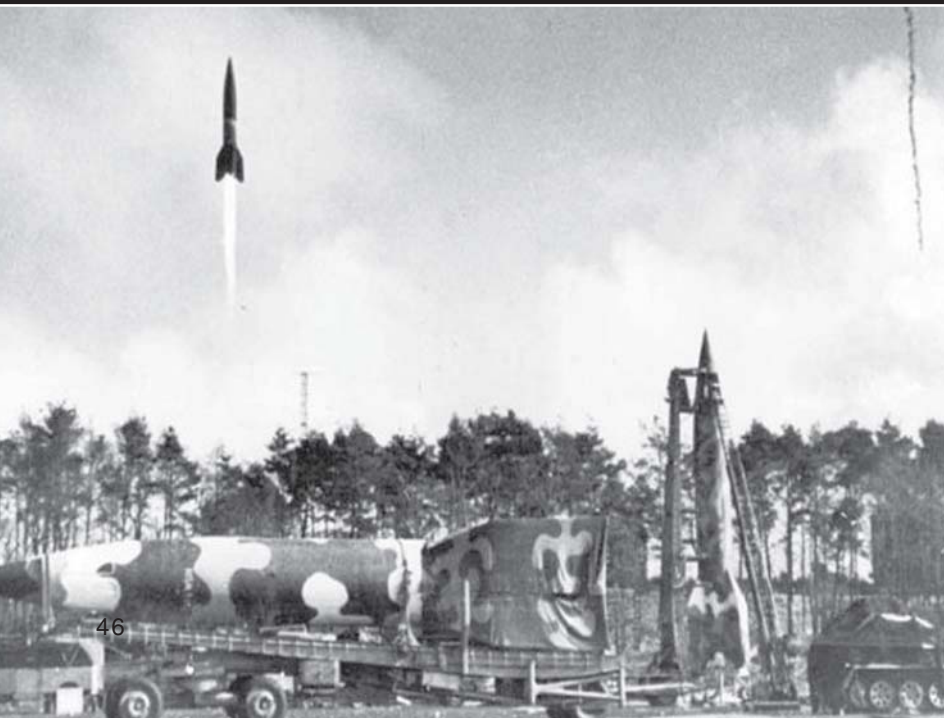


## Introduction

World War II was the greatest conflagration this planet has ever known. It started as a few hegemonic nations annexing territory for economic reasons, then became an ideological battle between right and wrong, and finally ended in a battle of survival for Germany. Facing the Allies' unconditional surrender demands, the Germans combined fervent ideology, a powerful industrial base, and cutting-edge technology to produce weapons to stave off the Allied tide. The effort was mostly concentrated in developing air weapons,

where Germany tried, and ultimately failed, to meet the dual and competing needs of strike and air defense. Germany developed several *wonder weapons* to overcome Allied quantitative superiority. Some of these weapons were obviously flights of fancy, while others served as the basis for many US and Soviet weapon systems in the Cold War. German wonder weapons were a cut above anything the Allies had, yet they were not able to change the tide of war because there were not enough of them on operational status. This fact generates two questions. First, why couldn't the Germans produce and

# GERMAN WON



deploy their advanced technology in any effective numbers? Second, if German wonder weapons had reached the front in quantity, would they have made a difference in the war's outcome?

### **The Wonder Weapons**

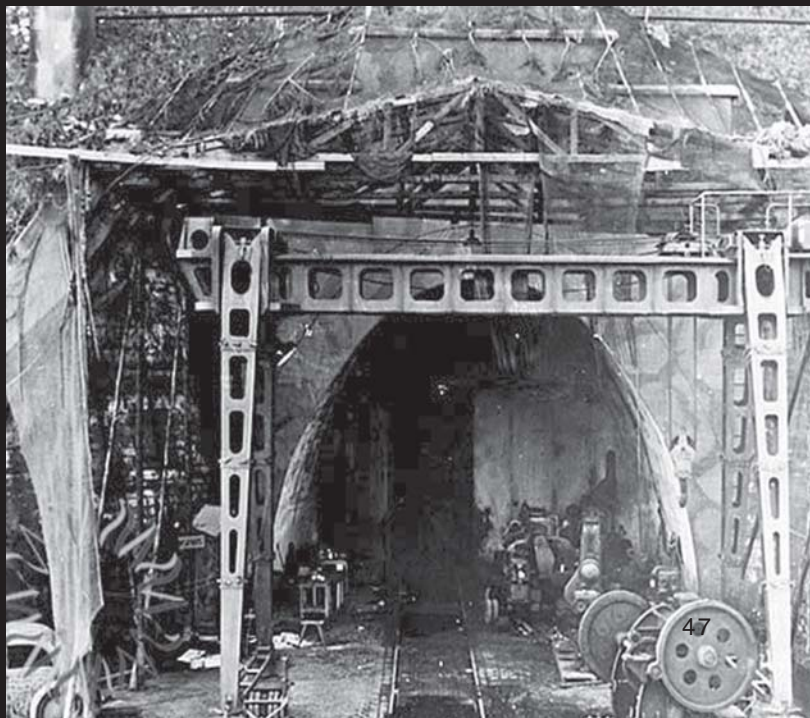
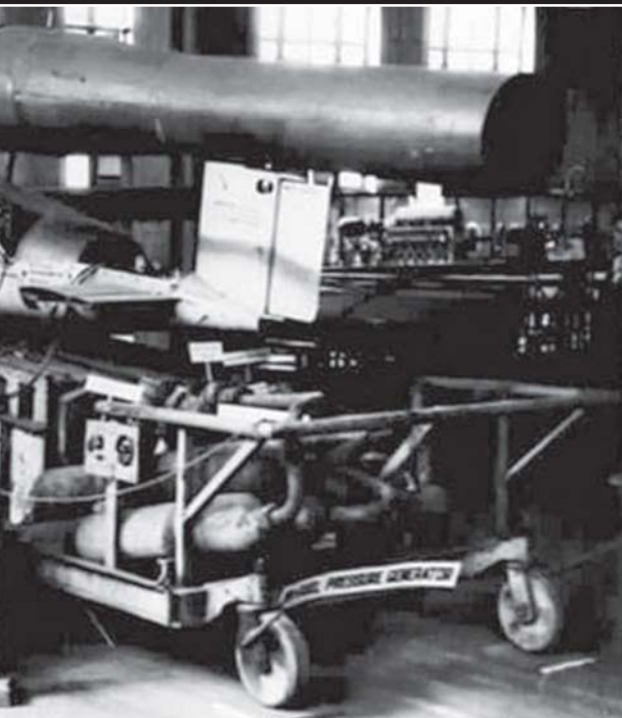
Germany produced a large number of high-technology weapons during World War II. However, unlike the Allies' atomic bomb, electronic warfare, or Norden bombsight, the Germans were unable to reap benefits from their investment.

The Messerschmitt Me 262 is, along with the V1 and V2, the best known of Germany's wonder weapons. It could fly at more than 540 miles per hour (compared to the P-51's 437 miles per hour); had an operational ceiling of 37,000 feet; and packed a punch with its four heavy, fast-firing 30-millimeter MK 108 cannons concentrated in the nose.<sup>1</sup> It was so far advanced beyond other fighters that General Adolf Galland, commander of Luftwaffe fighters, declared on his first flight, "It felt as if an angel was pushing."<sup>2</sup> The technology behind this superb aircraft was the turbojet engine, which produced

**Major Todd J. Schollars, USAF**

# **DER WEAPONS**

## **Degraded Production and Effectiveness**



## German Wonder Weapons: Degraded Production and Effectiveness



*Germany was an early pioneer of air-to-air and air-to-ground rockets and missiles.*

more power than piston engines and created less drag than a propeller. The amazing performance of the turbojets shocked Allied aircrews when they first saw the Me 262. It could easily outrun escort fighters, allowing Luftwaffe pilots to dictate the terms of combat. This was especially important for overcoming the Allies' quantitative advantage. Once they were in close, they could deliver devastating fire from their cannon and rocket armament; only a few hits could bring down a heavy bomber.<sup>3</sup> The Me 262 clearly made Allied air leaders nervous because it represented the potential for Germany to regain air superiority. However, the aircraft was not without problems.

The turbojets of the 1940s were still in their infant stage and required delicate care from pilots and maintenance personnel alike. Any sudden throttle movements could cause an engine flameout, resulting in deceleration and a lengthy engine restart—not ideal when a pilot was in combat. The high speeds made formation flying difficult, complicating the concentrated attacks essential to breaking up bomber formations.<sup>4</sup> Both these limitations required highly experienced pilots, something Germany would find in short supply late in the war. Additionally, maintaining the Junkers Jumo 004 engine was time-consuming and needed considerable skill, also in short supply. Each engine had a life of about 15 to 25 hours before needing replacement,<sup>5</sup> creating both maintenance and logistics supply headaches. Rarely did an Me 262 geschwader (wing with 60 to 90 aircraft) have more than 16 serviceable aircraft for a mission.<sup>6</sup> Even with these problems, the Me 262 was still a potential *war winner*, if not for production and operational obstacles.

Germany was an early pioneer of air-to-air and air-to-ground rockets and missiles. One of the simplest, yet most effective, was the R4M unguided rocket. The Me 262 could carry 24 of these small, simple, easy-to-produce weapons. Their size belied their strength: fired from outside the range of American .50 caliber defensive guns, one R4M had “indescribable efficiency—firing a salvo would hit several bombers—one rocket would kill them.”<sup>7</sup> The attacks had the added benefit of breaking up bomber formations, making them more vulnerable to other Luftwaffe fighters. R4Ms also had the same ballistic characteristics as the MK 108 cannon, meaning the Me 262 could use the same sight for both weapons.<sup>8</sup> A more advanced weapon was the X-4, a fin-stabilized, liquid propellant, air-to-air missile, having a speed of 600 miles per hour and a range of 3.7 miles. After firing it from an Me 262 or Focke-Wulf Fw 190, the pilot would guide it to the bomber target via a wire connecting the missile and launching aircraft. Then the missile would detonate on impact or with an acoustic fuze.<sup>9</sup> The guidance system had the major disadvantage that the pilot could not maneuver his airplane while guiding the X-4, a serious problem considering Allied escort fighters. Germany was developing an acoustically guided version, using a type of sonar to reach the target and explode, but the war ended before it was ready. Had the Germans deployed the R4M or X-4 in significant numbers, it could have dented the Allied bomber offensive. Moreover, since the Luftwaffe was primarily a striking force, German scientists did not confine themselves to air-to-air missiles.



Germany developed two air-to-ground guided weapons during World War II, both used primarily to stem the tide of Allied shipping crossing the Atlantic Ocean. The first was the Henschel Hs 293—a 1,100-pound bomb with 10-foot wings, a tail, and a liquid rocket engine. The launching aircraft would fire the Hs 293 from outside the target ship’s antiaircraft range (possible with the bomb’s rocket), then remote control it via radio during its terminal glide to impact. The Hs 293 only impacted at 450 miles per hour, so it had less penetrating power than conventional bombs and was effective only against merchant ships.<sup>10</sup> The Germans overcame the penetration problem with the Fritz X guided bomb. This weapon did not have any propulsion. Rather, the aircraft dropped it as a normal bomb, then the bombardier guided its steep descent by radio remote control.<sup>11</sup> Both the Fritz X and Hs 293 had spectacular success, but Allied defenses overcame these weapons because of limitations cited later. Interestingly, the primary carrier of both weapons was the Heinkel He 177, a bomber whose serviceability greatly limited the bombs’ employment, indicating Germany’s integration problems.

The Germans also used rockets to propel their fighters. Two specific rocket fighters stand out as examples of what Germany was first able to design, then what shortages drove them to implement. First, the Me 163 was a high-performance interceptor. It relied on its flying wing design and single Walter R II-203 rocket engine to produce astonishing performance. It could reach more than 620 miles per hour and climb to 20,000 feet in a little more than 2 minutes. Allied fighters could not touch it, and it presented bomber gunners with a near impossible leading aim calculation. Like the Me 262, however, its propulsion system was not perfect. The fuels were hard to manufacture, extremely corrosive, and would explode if not properly mixed.<sup>12</sup> Further, two of the fuel tanks were beside the cockpit; any vapor or liquid leaks were life-threatening to the single pilot. The rocket burned more than 18 pounds of fuel per second, giving it not much more than 100 seconds of total burn time before the Me 163 became a vulnerable glider. Therefore, while it was a good basic design, lack of further development made the Me 163 operationally ineffective.

The second German rocket fighter was driven purely by economic and pilot shortages. The Bachem Ba 349 Natter launched vertically, climbed at more than 15,000 feet per minute, then flew at 600 miles per hour into the Allied formations, where it released its noseful of unguided rockets. Once its fuel was spent, the Natter glided back to base where the pilot ejected himself and the rocket engine—both then parachuted to earth.<sup>13</sup> The reason for this event was threefold. First, the aircraft structure was cheap and made of noncritical materials, so it could be disposed of. Second, the rocket was difficult to manufacture, so it needed to be saved. German engineers also knew that the shock of landing was likely to detonate any residual fuel, with dire results for the engine and pilot. Finally, the Natter was designed for inexperienced aviators. Since the vertical takeoff required no skills and landings were not attempted, pilot

**German Wonder Weapons:  
Degraded Production and  
Effectiveness**

Introduction ..... 46

The Wonder Weapons ..... 47

Production Problems: Why  
Germany Could Not Deploy the  
Wonder Weapons ..... 50

Operational Difficulties: Would the  
Wonder Weapons Have Made a  
Difference? ..... 54

The V1 and V2 Case ..... 59

Relevance for Today: The US  
Defense Transformation ..... 62

Conclusion ..... 64



---

## German Wonder Weapons: Degraded Production and Effectiveness

*It is important to remember  
that while the air effort  
received the most attention,  
the Germans also developed  
land and submarine wonder  
weapons.*

training could concentrate on intercepting the enemy.<sup>14</sup> This was clearly an extreme circumstance brought on by Germany's desperate situation late in the war.

The final wonder weapons of note were the V1 and V2 rockets, likely the best known of any German weapons. The V1 or Vergeltungswaffe (vengeance weapon) 1 was the world's first cruise missile. It employed a novel pulse jet engine (which made a distinctive sound, hence the name buzz bomb) and short wings to carry its 1,874-pound warhead to targets up to 150 miles.<sup>15</sup> While the overall idea was advanced, the V1 was actually unguided and flew a straight course until its primitive range-setting device locked the controls and crashed the missile into whatever was below, detonating the V1's warhead. This obviously was not a precision-strike weapon, but it did kill 6,184 people in and around London. This is still a record number of cruise missile deaths, impressive considering the number the United States has launched in the last 13 years.<sup>16</sup> The V2 was a prewar project designed to attack targets beyond the range of artillery. It was an unguided ballistic missile and the forerunner of today's intercontinental ballistic missiles and tactical ballistic missiles (the Scud is a direct descendent). The 28,500-pound missile lifted its 2,200-pound warhead<sup>17</sup> in a ballistic trajectory, then plummeted to earth at more than 2,200 miles per hour.<sup>18</sup> V2s were unstoppable after launch; the only way to halt them was bombing the factories or launch sites. V2s inflicted 2,754 deaths in London, Amsterdam, and Antwerp, a record that stood until the immense Scud exchanges of the Iran-Iraq wars.<sup>19</sup> The V1 and V2 were the only mass-produced and employed wonder weapons. As we will see later, there were several reasons why they were not able to produce the effects Germany needed to turn the tide of war.

It is evident the Germans developed air weapons without equal. However, their failure to mass-produce and deploy these weapons is a monument to *what could have been*. It is important to remember that while the air effort received the most attention, the Germans also developed land and submarine wonder weapons, all theoretically capable of providing the push Germany needed to overcome the Allies.

### **Production Problems: Why Germany Could Not Deploy the Wonder Weapons**

Germany arose from the ashes of Versailles to become a huge economic power. Its industry, technology, and mass-production capacity led Europe and most of the world in the 1930s. So why could Germany not produce its wonder weapons in significant numbers? The problem was not capability. Rather, it was the restrictions and obstacles Germany placed on its industry that affected the production time line of extremely sensitive weapons. Four reasons behind Germany's lack of production are discussed here: political and military interference; the difficulty of mass producing advanced weapons; a lack of strategic vision; and finally, damage and dispersion resulting from the Allies' Combined Bomber Offensive. Any one of the reasons was enough to hamper generating high-technology arms; all four in concert were absolutely crippling.

---

## German Wonder Weapons: Degraded Production and Effectiveness

Political interference was a great obstacle to producing weapon systems and was particularly fatal to advanced systems that required long development times. The political obstruction started early and at the top of the Nazi hierarchy. On 11 February 1940, Hitler canceled all development work that could not get aircraft to the front within 1 year.<sup>20</sup> Work stopped on a half dozen major projects, from jets to long-range bombers, all of which would have made the Luftwaffe more capable of fighting a lengthy war. When Germany became desperate for advanced weapons, its hurried response would produce aircraft that had not benefited from full development processes. So confident in early victory were Germany's leaders that they cut the legs out from under the Luftwaffe before the major war really started, denying it any chance of victory in a drawn-out conflict.

High-level conflicts marked the Nazi regime, as Hitler dueled with his advisors for control of the German military's strategic direction. Hitler cut through many of these disagreements by removing dissenters and consolidating power to himself. For example, he already had taken command of military operations when he took control of critical production programs. Although Hitler had a weak technical knowledge of aviation,<sup>21</sup> he realized the importance of jet engines and personally controlled jet engine allocation after June 1944.<sup>22</sup> His tight control took allocation away from production experts. The result was haphazard distribution to manufacturers and operational units, with a corresponding drop in production and aircraft in-service rates. Compounding Hitler's central control was his top officials' fear of or refusal to confront him on decisions they knew were wrong. At best, dissenters received Hitler's extreme verbal abuse and, at worst, removal from office. By 1943, Hitler distrusted the Luftwaffe, and there were many cases of Hermann Goering's passively watching Hitler sow the seeds of his air force's destruction.<sup>23</sup> Even the outspoken Erhard Milch, chief of Luftwaffe production, took orders without objection. When Hitler *uncanceled* the Me 209 program in August 1943, Milch said, "But I have my orders. I am a soldier and must obey them."<sup>24</sup> He knew the restart would split Messerschmitt's production between an obsolescent fighter that would never see operational service (the 209) and a potential war winner (the 262). The best and most damaging example of this phenomenon is seen in the saga to produce the Me 262.

The Me 262 jet started development as a fighter and had capabilities far beyond contemporary piston engine aircraft. It was the top priority for production after Galland's first flight and subsequent endorsement. Milch canceled the Me-209 program to devote full attention to the new jet. However, Hitler interfered and restarted Me-209 production, largely out of fear of another failed advanced aircraft (such as the He 177) and its associated risk. There already were several problems with getting the Me 262 into production. Milch knew Hitler's decision to continue the Me 209 would take up space on Messerschmitt's assembly lines and delay operational employment of the Me 262 but went along, happy the Me 262 was still a fighter.<sup>25</sup> Unfortunately, Hitler's interference in the program had only started.

*Although Hitler had a weak technical knowledge of aviation, he realized the importance of jet engines and personally controlled jet engine allocation after June 1944.*

---

## German Wonder Weapons: Degraded Production and Effectiveness

*Making inferior planes not  
only put the Luftwaffe further  
behind but also took  
assembly line space away  
from advanced projects.*

Hitler observed Me-262 demonstrations in December 1943 with several staff members, including Goering, Milch, and Galland. After seeing the Me 262, Hitler remarked, “I see the Blitz bomber at last! Of course, none of you thought of that!” Galland, referring to the plane’s obvious fighter characteristics, remarked in his autobiography, “Of course, none of us had.”<sup>26</sup> Milch actually went behind Hitler’s back and continued developing the Me 262 as a fighter. When Hitler found out and confronted him at a meeting on 24 May 1944, Milch responded that the plane required extensive modifications and delays to become a bomber. Hitler exploded. “You don’t need any guns. The plane is so fast it doesn’t need any armorplate either. You can take it all out!” He then turned to the Luftwaffe’s director of research, who responded that Messerschmitt could make the modifications without difficulty (actually, removing the guns and armor to make way for bombs would have changed the center of gravity so much Messerschmitt would have had to move the wings). Goering and Galland were so browbeaten, they remained silent, but Milch finally had enough, saying, “Even an infant could see it was a fighter.”<sup>27</sup> Hitler fired him 2 weeks later. Thus, Hitler’s meddling and his highest advisors’ ineffectiveness at objecting caused significant delays in a potential war-winning aircraft and led to the dismissal of his best aircraft production coordinator. The Me 262 eventually would become a fighter but too late to be produced in numbers sufficient to wrest air superiority from the Allies. There were other systemic problems with producing the jet fighter, but Hitler’s interference made it impossible for Messerschmitt to stick with a firm production schedule. This was only one of several obstacles that kept the wonder weapons out of the air.

High-level interference and bickering were not the only impediments to production. The Luftwaffe’s officers contributed as well. Galland remembers rival fanatical groups within the officer corps, some more dedicated to Nazi idealism than actually producing an effective air force. This led to a crisis of trust and leadership, two elements on which depends the fighting strength of any unit.<sup>28</sup> Its result was no single voice speaking for the operational and strategic needs of the Luftwaffe; it also made it difficult for the Luftwaffe to present a united front to deflect high-level interference in weapons programs. Furthermore, we often remember the Luftwaffe as an honorable band of eagles. However, several pilots accepted checks from aircraft companies to endorse their products—planes that were often inferior.<sup>29</sup> This, combined with Goering’s financial interest in several aviation factories, meant Germany based production choices on personal profit, rather than capabilities. Making inferior planes not only put the Luftwaffe further behind but also took assembly line space away from advanced projects. Military interference also played on a grander scale before the war even started by creating a war industry that could not meet the demands of mass production.

Germany’s advanced technology production problems lay both in the character of the industry and pervasive military interference from project inception through delivery. First, German industry was craftsman-based

---

## German Wonder Weapons: Degraded Production and Effectiveness

to deliver very complicated weapons.<sup>30</sup> This was ideal for creating wonder weapons but made it nearly impossible to mass-produce them. Second, the armaments industry spread its capacity over several different specialized designs. Instead of a core of proven aircraft, German industry had 425 types,<sup>31</sup> once again hindering mass production and limiting the number of advanced aircraft produced. The reason behind this structure was military fastidiousness—the Wehrmacht liked working with specialized craftsmen because they could respond to the field's demands for weapon changes.<sup>32</sup> These changes did make the weapons more effective, but the constantly changing specifications made mass production impossible. No engineers or industrialists were consulted before making changes,<sup>33</sup> creating inefficiencies that further limited production. Finally, the Luftwaffe's first transformation came during the 1930s, when it could upgrade its equipment in peacetime. Conversely, the Allies had to transform early in the war; then stuck with late 1930's technology pushed to its limits, a huge production capacity overcame any qualitative shortfalls. However, Germany tried to transform to wonder weapons late in the war. Transitioning to a superior model in war actually can cause substandard combat readiness and degraded logistics as operators and maintainers learn to deal with new technology.<sup>34</sup> The result was German industry produced too little, too late, and actually decreased the Luftwaffe's capability.

Political obstacles, military interference, and an industry ill-equipped to make advanced weapons combined to hinder the wonder weapons' deployment. The cause of these problems was a complete lack of strategic vision, which prevented effective campaign planning and long-term weapons production. The lack of vision began at the highest levels and set a tone of short-range thinking that permeated the Luftwaffe, ultimately crippling its ability to prosecute any kind of strategic warfare. Goering was an extremely able fighter pilot. During World War I, he took command of Manfred von Richthofen's Jasta when the *Red Baron* died in action. However, Goering never gained the technical and logistical perspective needed to command an entire air force.<sup>35</sup> Before the war, he abandoned the 10-year prewar plan for a well-staffed and exercised strategic air force in order to attain short-term goals quickly.<sup>36</sup> The discarded plan included high-tech weapons, long-range strike aircraft, and the ability to put the German economy on a war basis before hostilities began. Even in early 1941, Goering could have pursued an aggressive program to increase German production but failed to do so. Luftwaffe military leaders also were more interested in active operations than preparing for the long term, because they desired tactical superiority at the expense of strategic readiness. This resulted from the massive catchup game Luftwaffe personnel played between the wars and made the officers technocrats and operations experts with limited vision. They could not relate airpower to national strategy, and the resulting defects were fatal.<sup>37</sup> When losses outstripped production in 1942, the Luftwaffe finally demanded construction increases. By the time the numbers caught up, there were not enough aircrews to fly them.<sup>38</sup> The only vision Germany had was a fanatical

*The lack of vision began at the highest levels and set a tone of short-range thinking that permeated the Luftwaffe, ultimately crippling its ability to prosecute any kind of strategic warfare.*

---

## German Wonder Weapons: Degraded Production and Effectiveness

*The lack of vision began at the highest levels and set a tone of short-range thinking that permeated the Luftwaffe, ultimately crippling its ability to prosecute any kind of strategic warfare.*

desire for a technological breakthrough to turn the tide of war,<sup>39</sup> relying on a belief in German superiority rather than reasoned strategic planning. Their fanatical desires not only diverted resources from realistic weapons programs but also gave the Allies targets for the Combined Bomber Offensive—the final impediment to German wonder weapons production.

Any discussion of German weapons manufacturing difficulties is incomplete without considering the Allied bombing campaign. Basically, the Combined Bomber Offensive made an already bad situation untenable for manufacturing wonder weapons. The reader must understand the Combined Bomber Offensive did not stop aircraft production—in fact, more aircraft rolled off the lines in 1944 (39,807) than in any previous year (15,904 in 1942, 24,807 in 1943).<sup>40</sup> However, it caused many operational problems for the Luftwaffe, as we will see in the next section. The Combined Bomber Offensive did cause two major problems with production, negating the impact of increased numbers. First, the bombing forced German industry to disperse, a measure contradictory to mass production.<sup>41</sup> Unlike America's huge aircraft plants like Willow Run, Germany had small factories in many places. While this made Allied targeting more difficult, it also hindered component integration. Different manufacturers also used different tolerances, meaning parts often did not fit together when assembled in the field.<sup>42</sup> Second, as soon as the Allies saw German wonder weapons in action, they were quick to find and strike the factories. After seeing Me 262s successfully attack a US bomber formation at 100 to 1 odds, General James H. Doolittle told Air Marshal Arthur Tedder, "Something must be done, and done quickly."<sup>43</sup> The result was dedicated, systematic attacks on wonder weapon facilities. It is very difficult to mass-produce sensitive, technically advanced weapons with dispersed industry subject to intense bombing. Increased Allied pressure also caused heavy operational losses with which replacements could not keep pace. This attrition was the final explanation for why the Germans could not produce their wonder weapons in significant quantities and turn the war in their favor.

### **Operational Difficulties: Would the Wonder Weapons Have Made a Difference?**

This article has shown the obstacles Germany faced that made wonder weapon mass production and deployment nearly impossible. Even so, it did get limited numbers of its advanced hardware into service. This section will examine whether or not additional weapons would have attained Germany's goals. We must consider both the equipment and other factors such as available crews, training, and the operational constraints imposed by the Luftwaffe's ineptitude and the Allies' air superiority actions.

The first questions we must ask are, were the wonder weapons really that advanced, and if so, were they practical? In many individual cases they were advanced beyond the Allies' equipment, but they were incomplete packages lacking systems integration to other technology.



---

## German Wonder Weapons: Degraded Production and Effectiveness

For example, the Me 262 had the devastating 30-millimeter cannon. However, it never reached its full potential because the world's best optics industry could not design a good gyro gunsight that would fit in the jet.<sup>44</sup> A few experienced pilots learned to overcome the deficiency, but increasing numbers of rookies could not, leading to poor combat performance of an otherwise devastating weapon system. Further, the advanced Me 163 quickly ran short of fuel, then glided back to base. Similarly, the Me 262 flew slowly in the landing pattern, and its sensitive jets precluded any sudden power increases. US fighter pilots knew this and, thus, overcame the rocket and jet menace by orbiting their airfields, waiting to bounce the vulnerable fighters returning to base. This, in turn, forced the Germans to use Fw 190Ds for combat air patrols over their fields,<sup>45</sup> further exacerbating the fuel shortage. The air-to-ground weapons likewise had their faults. After releasing the Fritz X or Hs 293, the bomber had to fly a predictable course at only 165 miles per hour until bomb impact,<sup>46</sup> making the lightly armed bombers easy prey for naval fighters. Therefore, while the German wonder weapons were sophisticated, the failure to integrate them into total weapon systems presented vulnerabilities easy for the Allies to exploit.

The advanced technology also presented maintenance headaches for Luftwaffe ground crews. The previous section showed how production problems led to limited spares fabrication and parts incompatibility. Additionally, the emphasis on producing great numbers of new aircraft meant manufacturers were unwilling to *waste* production line space on spare parts, including jet engines.<sup>47</sup> The result was lower in-service rates for aircraft, because without spare parts, damaged aircraft were not repaired. Instead, ground crews cannibalized what they needed to keep other planes in service.<sup>48</sup> Cannibalism invariably led to fewer and fewer operational aircraft. The following story shows the effect of these maintenance troubles. Galland visited JG-7 (Kommando Nowotny) to see the Me 262 in action. The wing's leader, 250-kill ace Major Walter Nowotny, wanted a maximum effort to show why the Luftwaffe needed more Me 262s. This maximum effort consisted of 4 planes out of a unit of 80 aircraft; 2 of the 4 subsequently broke before takeoff. US pilots, having overwhelming numbers, then shot down one of the two remaining aircraft when Nowotny's engines malfunctioned during the dogfight.<sup>49</sup> Germany thus had lost one of its best fighter leaders, who was flying the best aircraft of his career but was let down by a system that could not integrate and maintain it.

Resource shortages forced Germany to use lower technology to gain increased performance. Fuel scarcity led Messerschmitt to experiment with simple steam turbine engines that used 65 percent coal and 35 percent petrol to deliver 6,000 horsepower.<sup>50</sup> They used the Me 264 long-range bomber as a test bed but were not able to produce and integrate the efficient engines before the war ended. Junkers also developed the long-range Ju 390 and worked on a refueling version to take Ju 290 bombers across the Atlantic. Even if the rumored Ju 390 flight to within 12 miles of New York

*Resource shortages forced  
Germany to use lower  
technology to gain increased  
performance.*

---

## German Wonder Weapons: Degraded Production and Effectiveness

*Starting early in the war, the Luftwaffe's faith in early victory kept it from increasing the front-line force, so there was no pressure to raise training output.*

is true,<sup>51</sup> this wonder weapon still could not hit America where it hurt—the industrial areas of the upper midwest. The same would hold true had the airplane used the coal and petrol engines. Similarly, the He 162 jet fighter was another step back: its wooden construction used noncritical materials and unskilled labor.<sup>52</sup> Hitler Youth were the intended pilots, problematic considering the plane's tricky handling. Hitler considered the aircraft and pilots expendable to stop the Combined Bomber Offensive. Fortunately for the young crews, they never flew in combat. While these wonder weapons allowed Germany to concentrate more material and fuel on other projects, they contributed no real capabilities to the Luftwaffe.

The most salient reason the wonder weapons would not have given Germany any advantage was the decreasing skill and experience of Luftwaffe pilots by the time the advanced systems arrived. There were two main reasons for waning crew proficiency. First, many of the best pilots had been killed in action or rendered unfit for duty. Operational losses meant there were few *experten* left in service. In fall 1944 alone, the Luftwaffe lost 12 pilots with 1,146 kills among them.<sup>53</sup> This not only decreased Germany's combat capability but also meant there were few *old hands* left to pass on hard-won knowledge to the new pilots. Most had been flying since 1939-1940 (some even had Spanish Civil War experience), giving them unmatched combat experience. However, the lengthy combat time placed a tremendous physical and psychological stress on them. Indeed, Galland noticed the lack of fighting spirit, even in 1943, when he saw several fighters fire on bombers from too far away to be effective, then leave for home.<sup>54</sup> However, there were some pilots ready to fight, and the limited wonder weapons gave them the spirit to return to duty. When assembling his Me 262 wing, Jagdverband 44, Galland rounded up the most raffish, battle-hardened veterans, several from the pilots rest home. "Many reported without consent or transfer orders. Most had been in action since the first day of the war, and all had been wounded. The Knights Cross, so to speak, was the badge of our unit. Now after a long period of technical and numerical inferiority, they wanted once more to experience the feeling of air superiority. For this, they were ready once more to chance sacrificing their lives."<sup>55</sup> Unfortunately for them, there were far too few pilots and even fewer superior weapons, those being not advanced enough to matter. Germany had again failed those who served her so well.

The second reason for the decreasing pilot skill was the poor state of the replacement program. Starting early in the war, the Luftwaffe's faith in early victory kept it from increasing the front-line force, so there was no pressure to raise training output.<sup>56</sup> When heavy losses set in, there was no reserve from which the Luftwaffe could draw. Later, when it realized it needed replacements quickly, the Luftwaffe lowered training time to only 112 hours, with 84 percent of the time spent in basic aircraft instead of high-performance combat types.<sup>57</sup> This was half the time Allied pilots received. The air force also converted bomber crews to fighters, but the 20 hours' training they received was not enough to prepare them for the rigors of outnumbered fighter combat. Hitler even ordered all fighter

---

## German Wonder Weapons: Degraded Production and Effectiveness

groups on the Eastern Front to send two of their best pilots to the Reich's defense forces,<sup>58</sup> making the German lack of air superiority in Russia even worse. Finally, the Combined Bomber Offensive created a fuel shortage, leading to training curtailment as early as 1942.<sup>59</sup> Lack of fuel decreased instruction flights, further reducing new pilot skill and experience. All the above meant pilots arriving at the front were not skilled enough to handle basic aircraft, much less employ the highly sensitive wonder weapons (Galland relates how even his veteran pilots had trouble lining up for kill shots in the very fast Me 262).<sup>60</sup> This happened at the time Allied pilots were becoming more numerous and better trained as a result of combat veterans who were rotating home to instruct new pilots. Allied pilots also were becoming more experienced because of lower combat losses and were flying more aircraft of the same caliber as most German fighters. As the Luftwaffe's losses mounted, it closed the advanced schools, then the basic schools, moving the pilots and aircraft to operational units.<sup>61</sup> Replacements stopped just when the wonder weapons were arriving in numbers. Therefore, even with larger numbers of advanced aircraft, the Luftwaffe did not have the crews to fly them, negating their potential effect on the war's outcome.

Several operational reasons kept the wonder weapons, even in greater numbers, from changing the course of the war. Most of these explanations arose from Allied air superiority and the Combined Bomber Offensive's incessant attacks on German industry and transportation. The struggle for air superiority in 1944 made the Luftwaffe commit 82 percent of its manpower and aircraft to defending the Reich.<sup>62</sup> While this estimate seems high, it does reveal how Germany had to retain forces to protect itself. Further, several wonder weapons, such as the Me 163, were point defense weapons. They were effective defenders but were incapable of extending air superiority over Allied territory or protecting the German Army from Allied close air support and interdiction. Lack of air superiority also meant the Luftwaffe could not conduct offensive operations. This left Germany with no route to victory, as the Allies' goal of unconditional surrender meant Germany could not play a defensive waiting game. Last, defending Germany used many weapons that would have been useful for ground defense and offense. For example, the Luftwaffe employed 10,000 88-millimeter guns as anti-aircraft artillery; these guns were also the most effective anti-tank cannons of the war. Moreover, 500,000 people manned the air defense system, depriving Germany of needed ground troops and factory workers.<sup>63</sup> Hence, wonder weapons in sufficient quantity would provide adequate defense but would not have enabled Germany to go on the offensive and push the Allies away from its borders. As it was, Allied close air support and interdiction left Germany no avenue to overcome the numerical superiority of US and British ground forces.

Allied interdiction and the ground offensive also kept the wonder weapons from making a meaningful contribution. Allied armies overran many of the Luftwaffe's front-line airfields after the D-day invasion, forcing the Germans farther to the rear. Their subsequent operations from

*Several operational reasons kept the wonder weapons, even in greater numbers, from changing the course of the war.*

---

## German Wonder Weapons: Degraded Production and Effectiveness

*More wonder weapons  
inefficiently employed would  
not have improved the  
situation.*

unprepared fields caused lower serviceability, so the Luftwaffe could not meet Allied quantitative superiority with higher intensity operations.<sup>64</sup> Relatedly, Ultra intelligence revealed German movement plans and allowed the Allies to attack Luftwaffe ground units en route to their new airbases.<sup>65</sup> This prevented supplies, parts, and mechanics from arriving to service their airplanes. Finally, the Allies' dedicated attacks on German transportation, especially the railroads, kept new aircraft components from reaching their assembly points (necessary because of the dispersed factories discussed previously). They also destroyed completed aircraft before they could reach combat units.<sup>66</sup> The wonder weapons were no exception—the Allies knew their value and were intent on killing the airplanes on the ground instead of facing them in the air. Consequently, wonder weapons in greater numbers would not have had the chance to become operational. If they had, they would be starved for gas; lacking pilots; operating from bases with no ground support; and thus, incapable of making a difference.

History shows that superior aircraft did reach operational units. However, there were employment problems that would have increased had Germany deployed more of the advanced aircraft. First, Hitler was overtly hostile to any defensive measures. This, combined with his control of advanced production, meant fighter and anti-aircraft deployments were piecemeal. Hitler believed a more effective defense was to meet terror with terror, causing him to deploy his new weapons in less than optimal ways.<sup>67</sup> Once airborne, the defenders did have the benefit of aircraft acting as airborne command posts to coordinate attacks.<sup>68</sup> However, it was only a local measure and did not affect the overall defense of Germany because it could not provide theater-wide situational awareness. Galland sums it up best: "We not only battled against technical, tactical, and supply difficulties, we also lacked a clear picture of the air situation, of the floods coming from the west—absolutely necessary for the success of an operation."<sup>69</sup> More wonder weapons inefficiently employed would not have improved the situation. They likely would have caused more confusion for the limited C2 system coordinating attacks on the bomber forces.

The final reason for the ineffectiveness of the wonder weapons comes from their secretive development and combat employment. Except for Goering and Milch, the Luftwaffe did not know about the Me 262's development until it was already in advanced testing.<sup>70</sup> There was no way for the units to develop training or tactics for the new aircraft if the operators did not know the planes were coming. Often a pilot's first experience with the aircraft would be in combat, with less than optimal results. Additionally, when Galland set up his JV-44 jet fighter unit, it was not subordinate to anyone—many felt it had finally shaken the micromanagement that had ruined the program. However, Hitler would not allow JV-44 to have contact with other units, fearing their defensive mindset would contaminate strike units.<sup>71</sup> This isolation was an effective quarantine, meaning the best pilots could not share their skill and

---

## German Wonder Weapons: Degraded Production and Effectiveness

experience with other units, especially those trying to employ complex equipment with rookie crews. The new pilots then had little chance to improve except in one-sided combats with Allied fighters. Lack of tactics for the advanced aircraft and the moratorium on sharing expertise would have made more wonder weapons just as ineffective and would have given the Allied fighter pilots easier targets.

The Luftwaffe was unable to prove what it could have done with more wonder weapons, as production difficulties kept it from reaching the operational numbers that could have made a difference. Incompletely integrated technology, decreasing crew skill and experience, a deficient training program, and Allied attacks kept the advanced aircraft in service from effective operations. These problems would have handicapped greater numbers as well. Galland's comment at the war's end concludes it well. When his unit finally received Me 262s, he said:

But this was 1945! In the middle of our breakup, at the beginning of our collapse! It does not bear thinking what we could've done with jet fighters, 30-millimeter quick-firing cannons, and 50-millimeter rockets years ago, before our war potential had been smashed, before indescribable misery had come over the German people through the raids.<sup>72</sup>

Fortunately for the Allies, the wonder weapons did not arrive on the scene until it was too late to make their mark.

### The V1 and V2 Case

So far, we have seen several reasons why the wonder weapons would not have made a difference, even if Germany had deployed them in significant numbers. However, there is a case showing two wonder weapons Germany managed to develop, produce, and use in large quantities: the V1 cruise missile and V2 ballistic missile. This section will further prove the point that greater numbers of advanced armaments would not have made a difference by demonstrating how 35,000 V1s<sup>73</sup> and 10,000 V2s<sup>74</sup> could not change the war's outcome. The primary reasons were the missiles' technology, the theory behind their combat employment, and production interference. It is logical to assume the other wonder weapons would experience similar problems had Germany mass-produced them.

The first topic is numbers. As we saw earlier, Germany built 35,000 V1s and fired 9,200 of them, killing 6,184 people in England.<sup>75</sup> Likewise, 1,300 V2s hit England between October 1944 and March 1945, killing more than 2,700 and wounding 19,000. V2s had some success degrading Allied logistics with attacks on Antwerp but, on the whole, were another futile effort to turn the war in Germany's favor. Why couldn't huge numbers of these weapons make a difference, especially considering the V2 was unstoppable?

No other countries developed cruise or ballistic missiles during World War II. In fact, the United States and Soviet Union used both the V1 and V2 to create their own systems after the war. However, closer examination reveals the missiles had several of the other wonder weapons' problems:

*It is logical to assume the other wonder weapons would experience similar problems had Germany mass-produced them.*



---

## German Wonder Weapons: Degraded Production and Effectiveness

*It is logical to assume the other wonder weapons would experience similar problems had Germany mass-produced them.*

relatively low technology, little systems integration, and minimal reliability. To start, Allied fighters could easily catch the slow (400 miles per hour) V1s and shoot them down. If they were out of ammunition, a few pilots dared to tip the V1s over by placing their wing under the V1's wing and then flicking it up, causing the missile to spin out of control.<sup>76</sup> The British set up dedicated warning nets to detect the incoming V1s and then sent out interceptors. Royal Air Force (RAF) action thus dispatched 4,000 of the 9,000 V1s fired.<sup>77</sup> Interestingly, the British kept all their new Meteor jet fighters in England to deal with the missile threat.<sup>78</sup> However, this was not a victory for the wonder weapons, as the Meteors did not have the range to escort bombers and were not ground attack aircraft either (the Allies already had plenty of aircraft to cover those missions). Vulnerability to interception was not the V1's only problem. A greater fault afflicted it and the V2: lack of accuracy.

It is logical to assume the other wonder weapons would experience similar problems had Germany mass-produced them. V1s had a 12 kilometer of circular error probable (CEP), while V2s had a 6-kilometer CEP,<sup>79</sup> meaning only half the rounds fired fell in a circle with the CEP's radius. The reason was neither *advanced* system had a guidance computer. The V1 flew straight at a constant speed (the engine actually lost efficiency as it burned, keeping the missile at the same speed even though it was getting lighter as it burned fuel),<sup>80</sup> then plunged to earth after the primitive air log propeller in its nose had counted the appropriate number of rotations. Once the air log reached the preset number, it locked the V1's controls so it would dive into whatever was below.<sup>81</sup> The Army's V2 was designed as long-range artillery<sup>82</sup> and essentially lobbed its warhead beyond gunfire's range. Considering the problems of ballistics, high-speed reentry, and rocket efficiency variations from poor fabrication, it was lucky any V2s hit their targets. Even a simple guidance system would have made the missiles more accurate and, certainly, more a threat to Allied targets. These limitations point to the fact that the V weapons were not that technologically advanced—an issue that reduced their effectiveness.

The V weapons caused relatively few deaths or damage, especially compared to the Combined Bomber Offensive. Three reasons caused the lack of destruction. First, the horrendous accuracy made pinpoint attacks impossible. The Germans did develop a missile-mounted transmitter that stopped signaling when the V1 hit the ground, allowing corrections for the next shot.<sup>83</sup> The ever-resourceful British electronic-warfare teams countered this tactic, spoofing the signal to make the weapons miss by even more.<sup>84</sup> Second, both missiles had very short range: the V1 required launch sites in Holland, with the V2s not much farther back. Even that close to England, the missiles could not reach the heavy industrial areas. Once the Allies liberated Holland, then the rest of Western Europe, the missiles had no way to reach their targets. The only exception was He-111-launched V1s (the first air-launched cruise missiles), which were impractical because of Allied air superiority.<sup>85</sup> Third, the Allies knew well the capabilities of the V1 and V2, capabilities that would increase if

---

## German Wonder Weapons: Degraded Production and Effectiveness

Germany could improve the missiles' guidance. The RAF and the US Army Air Forces also knew where the Germans built and launched the weapons and subjected the installations to unrelenting attack. Once again, the Combined Bomber Offensive created a final obstacle for wonder weapons and made a system that was not making a difference completely useless. With their inherent problems, why then did Germany focus so many resources on building and launching the V weapons? The answer lies in the unique political and military views of the Nazi party.

The lack of accuracy did not bother the Nazis, as the weapons' main purpose was terror, a goal that denied the Germans any chance of effectiveness. Hitler believed they were the *decisive weapons* that would bring him ultimate victory by destroying England and the Allies' will to fight.<sup>86</sup> Had Hitler looked at his own people, he would have seen the Combined Bomber Offensive's tremendous destruction had not broken their spirit,<sup>87</sup> even under daily attacks that dwarfed the entire V1 and V2 campaigns. In addition, he should have learned a lesson from the Battle of Britain, where his extreme efforts could not touch the English spirit. While the V weapons did cause psychological strain,<sup>88</sup> the V1 counter campaign actually had a solidifying effect on British morale. The population eagerly tracked the operation's progress, hailing each interceptor's kill, especially the *tippers*.<sup>89</sup> England had no counter for the V2, but the people soon realized the low threat from the inaccurate missile, seeing it could only strike populated areas. They had dealt with terror raids before, and with the war going the Allies' way, they saw the V2s for what they were: weapons that could terrorize but not effectively hurt the Allies. Therefore, Hitler's purpose for employing the V1 and V2 actually helped the Allies' cause. At the same time, the weapons hurt Germany's chances for developing other wonder weapons.

The V weapon programs impaired other advanced projects by consuming vast resources and manpower that Germany could have used to make effective armaments. When Hitler saw a V2 demonstration film on 7 July 1943, he directed that the program receive whatever labor and materials it needed. The program cost more than 5 billion reichsmarks and absorbed tens of thousands of workers (many of them slaves, an additional factor in the poor workmanship)—enough to have produced 24,000 aircraft.<sup>90</sup> The effort compromised the rest of Germany's war economy and prevented programs from having real strategic worth. One such weapon was the Hs-117 radio-controlled surface-to-air missile,<sup>91</sup> something the Germans needed to counter the Combined Bomber Offensive. The resource expenditure did not stop with the basic missile. Germany pursued two extreme measures to improve the weapons. First, it developed a manned V1 much like the Japanese Ohka kamikaze rocket plane. Unlike the Japanese, the Germans found few volunteers to man the aircraft, even after a test program led by famous pilot Hannah Reitsch.<sup>92</sup> One can predict the program would have improved accuracy but would have resulted in many deaths from Allied interception before the missiles reached their targets. The second scheme involved a Type XXI submarine (another wonder

*The V weapon programs impaired other advanced projects by consuming vast resources and manpower that Germany could have used to make effective armaments.*

---

## German Wonder Weapons: Degraded Production and Effectiveness

*World War II Germany attempted to transform its war effort with technology but did not have the strategic vision, operational integration, or production capacity to pull it off.*

weapon) towing a V2 that rode in an underwater launch center to its liftoff point near the US east coast.<sup>93</sup> Although the designers knew it would have minimal accuracy, they justified the expenditure by saying the weapon's harassing effect would have strategic and political results. Germany produced one of these weapons in the 5 months preceding the war's end but never used it. These problems highlight Germany's complete lack of strategic vision and judgment of what made a successful weapon. The same problems would have affected the other wonder weapons had they reached mass production and deployment.

The V weapons were the only wonder weapons that saw mass production and employment yet had insignificant effect on the war's outcome. The basic problems of integration, poor accuracy, futilely striking morale, and wrongly prioritized expenditures made these wonder weapons, at best, useless, and, at worst, a war loser for Germany. We can see the same problems affecting the other advanced projects as well, showing again what little effect they would have, even in large numbers. In the final analysis, the wonder weapons only promoted the fantasy of the next technological breakthrough that would change the war.<sup>94</sup> This fantasy was at the expense of practical weapons that could have given the Luftwaffe and Germany a real chance at victory.

### Relevance for Today: The US Defense Transformation

Examining the past for historical interest is fine, but it has true value when one applies it to similar events happening today or that could happen in the near future. Adapting a common phrase, one can see that those who do not learn from the past are doomed to repeat it or, at least, will miss opportunities. World War II Germany attempted to transform its war effort with technology but did not have the strategic vision, operational integration, or production capacity to pull it off. One easily can draw a parallel between Germany's efforts and the current US transformation employment. This section will examine the ongoing US military transformation with respect to producing technology, integrating it with other innovations and current weapon systems, then using it to execute national security strategy in a challenging world. Additionally, it will compare German efforts to do the same, showing the pitfalls on the way toward dominance in all phases of warfare.

Producing high technology has been America's trademark since World War II. During the Cold War, the United States counted on quality to defeat the Warsaw Pact's quantity. Whereas the Germans canceled all programs that could not be completed within 1 year, Secretary of Defense Donald Rumsfeld wants to cancel all projects that do not take the military to the next level.<sup>95</sup> This is a result of the US strategic orientation toward the long term, rather than focusing on near-term issues. However, the Department of Defense (DoD) must avoid going to the other extreme, because putting all its hope in next-generation weapons will be to the detriment of current and proven technology. Two reasons support this point. First, advanced

## German Wonder Weapons: Degraded Production and Effectiveness

technology is very expensive, making it difficult to replace combat losses.<sup>96</sup> The Luftwaffe demonstrated this lesson, and the DoD would be wise to learn it. Second, wars are now *come as you are*, leaving little time to develop new weapons to meet current threats—it could be disastrous to get caught between technological advancements. The key for producing technology is how the United States spends money. Germany could not control its wonder weapons' escalating costs, and it skewed the entire war economy. If the DoD cannot control the exponential cost growth in next-generation weapons, it could price itself out of the defense business altogether. The United States needs to make astute decisions regarding successor weapon systems, in some cases making ruthless choices to ensure it spends money in the right places to produce effective forces within a reasonable time.<sup>97</sup> Producing technology is important; more crucial is how the military integrates that technology into operations.

Germany failed to integrate its world-leading technology into effective weapon systems, leading to arms that were not as effective as they could have been. Component shortcomings, lack of aircrews, and maintenance problems contributed as well. The current DoD transformation has a better focus. According to Rumsfeld, transformation is more than building high-tech weapons. It is about finding new ways of thinking and fighting. The goal is not to transform within 1 year or even 10 years—it is an ongoing process.<sup>98</sup> While DoD works the process, it cannot assume new is always better, because integration will always limit high technology<sup>99</sup> until all weapon components are at the same development level. Additionally, a smaller force of less sophisticated weapons leaves more money for maintenance and upgrades.<sup>100</sup> A good example of this is the recent reduction in the B-1 force, allowing the Air Force to upgrade the remaining bombers to be more effective against moving and time-critical targets. Relatedly, buying versatile weapons can bring down costs, improve integration, and increase effectiveness. The new push for an F/A-22 (vice an F-22) shows the Air Force is moving toward versatile platforms.<sup>101</sup> Integrating the technology is vital; equally crucial is taking care of the people who run the weapons. It would be a mistake for DoD to neglect training, retention, and services to pay for new weapons. Germany was unable to use its advanced aircraft for want of experienced aircrews. Current weapons are even more advanced and require the best people to make them effective when the military uses them.

Developing, producing, and integrating technology does no good unless the United States uses its transformed power in an effective way. There are four ways it can employ power to make the fullest use of the transformation. First, the services need clear concepts of operations (CONOPS) to guide both using the technology today and as a roadmap to the future.<sup>102</sup> Without thoroughly developed CONOPS describing how to employ new weapon systems to meet long-term goals, the DoD runs the risk of short-term thinking. The Air Force is pursuing eight CONOPS, covering everything from space to global strike and mobility, to realize its vision.<sup>103</sup> Second, the military must use a combination of old and new

*It would be a mistake for DoD to neglect training, retention, and services to pay for new weapons.*

---

## German Wonder Weapons: Degraded Production and Effectiveness

*The United States must be ready for asymmetric threats and let other countries fantasize about finding their own wonder weapons to change their fortunes.*

technology to get the job done. For example, Global Positioning System-guided munitions are superior high-accuracy weapons. However, they are much less effective without a man in the field using simple sighting equipment to find and pass target coordinates to orbiting aircraft. This supports the idea of not placing all hope in fantastic equipment. Third, while fighting the war on terror, the United States cannot become stuck in a defensive mindset like Germany did and lose its capability to strike its enemies. The Secretary of Defense and many other high-level government officials have stated the best defense against terror is a good offense,<sup>104</sup> an appropriate attitude that the United States has so far followed. Moreover, America should be realistic in planning to employ its power. The DoD has finally moved away from the two major wars scenario to a more realistic approach of fighting one major conflict while holding ground in other contingencies.<sup>105</sup> The DoD is doing this by replacing its Cold War threat-based approach with a capabilities-based view. This concept looks beyond current uncertain needs in order to maintain strategic flexibility and resistance to asymmetric surprise.<sup>106</sup> Thus, the capability-based approach directs readiness for the most likely military needs instead of preparing to counter threats that do not pose a realistic danger. Finally, the United States is strongly advocating effects-based operations (EBO).<sup>107</sup> These operations concentrate on achieving effects that will force the enemy to do our will, instead of just destroying targets that produce arbitrary effects. This requires the military to integrate all systems to find, target, and attack those centers of gravity that will make maintaining the status quo impossible for our adversaries. Attacks requiring pinpoint accuracy to eliminate collateral damage are tailored for advanced technology, but the United States must ensure it is hitting the right things. Germany squandered its ballistic and cruise missiles trying to attack British morale and ultimately did not attain its goal. The same fate awaits the United States if it does not do its homework to find those things that truly hurt its enemies.

Developing technology while not becoming over reliant on it, integrating advanced weapons to get full use out of all systems, and using the systems most effectively will allow the United States to avoid Germany's problems. Building a transformation to keep America ahead lets it fight on its terms and keeps enemies off balance and struggling to catch up. The United States must be ready for asymmetric threats and let other countries fantasize about finding their own wonder weapons to change their fortunes. If the DoD transforms correctly, it will not only be ready for them but also may even deter adversaries from using counter technologies against America.

## Conclusion

We now know the dominant weapons on the battlefield are the ones that can be mass-produced, operated by motivated fighters, kept in action with spares and supplies, and used in concert with other weapons.<sup>108</sup> Ignoring the above advice in pursuit of superior weaponry courts disaster. In the



---

## German Wonder Weapons: Degraded Production and Effectiveness

words of General George S. Patton, “How easily people can fool themselves into believing wars can be won by some wonderful invention rather than by hard-fighting and superior leadership.”<sup>109</sup> Nazi Germany possessed the technical prowess and industry to produce several wonder weapons during World War II. Its jet and rocket fighters, guided missiles, and cruise and ballistic missiles were all ahead of their time and superior to Allied armament. However, Germany could not transform its military into an effective force to stem the rising Allied tide for several reasons.

Germany’s first significant problem was producing and deploying its wonder weapons. Many times, Nazi politicians interfered in projects, creating obstacles to efficient production. Further, the military itself played too large a role in design and production specifications, with changing demands making any kind of mass production nearly impossible. Corruption also played a role in keeping incompetent designs afloat, taking valuable production capacity away from truly useful projects. All this boiled down to a lack of strategic vision rising from the Germans’ overconfidence in quick victory, a problem that plagued both weapons production and military operations. Finally, the Combined Bomber Offensive made an already horrible system untenable and was the straw that broke Germany’s wonder weapons capacity.

Weapons are no good if a country cannot use them. Had Germany actually mass-produced its wonder weapons, it is doubtful they would have done any good. First, the weapons were not that advanced as systems because of German industry’s failure to integrate them into total packages. Second, long-term pilot losses led to decreasing crew experience. This, combined with an inadequate training system, meant there were insufficient pilots to fly the wonder weapons. The Luftwaffe compounded the problem late in the war when it completely stripped its training units, sending all pilots and planes to fight. Third, Germany’s focus on defense left it little capability to conduct offensive operations to truly hurt the Allies. When it did attack with its only mass-produced wonder weapons, the V1 and V2, it sought only terror effects. Its targeting mistake made the V missiles even more ineffective than their inherent inaccuracy dictated. Additionally, the missile program diverted enormous resources from other projects that could have dented the Allies’ progress. In the end, the blade that cut through Poland, France, and the rest of Europe could not be sharpened by the wonder weapons and was ultimately too brittle to survive the exhausting conflict.<sup>110</sup> It dulled against the Allies’ steel and concrete and was shattered in its turn, ending any chance of German victory.

The lesson Germany failed to learn is relevant today, as the United States moves to transform its military. We must heed the lesson that it is not enough to produce high technology with a short-term strategy. Instead, the United States must make careful choices on what to develop in the budget-constrained economy and fully integrate new weapons with the support systems and people on which they depend. Then it must effectively and realistically employ its transformed military to keep adversaries off balance. Producing, integrating, and employing new wonder weapons to

*Germany’s focus on defense left it little capability to conduct offensive operations to truly hurt the Allies.*

---

## German Wonder Weapons: Degraded Production and Effectiveness

strike targets for effects rather than brute destruction will bend adversaries to US will and allow the United States to attain its national security objectives. Germany lost the opportunity to become and remain a truly advanced power. America is totally dominant in many factors but must continue its ongoing transformation process to stay ahead and provide unmatched military effectiveness.

### Notes

1. Bill Gunston, *The Illustrated Encyclopedia of Combat Aircraft of World War II*, London: Salamander Books, Ltd, 1978, 74, 242.
2. Generalleutnant Adolf Galland, *The First and the Last*, trans, Mervyn Savill, New York: Henry Holt and Company, 1954, 253.
3. Jeffrey L. Ethell and Alfred Price, *The German Jets in Combat*, London: Jane's Publishing Company Limited, 1979, 60.
4. Interrogation of Generalleutnant Galland, 16-18 Sep 45, typed transcript, 570.619A, in USAF Collection, Air Force Historical Research Agency (AFHRA), Maxwell, AFB, Alabama, 2.
5. Interrogation of Hans Fay, test pilot for Messerschmitt, Me 262 jet-propelled aircraft and Me 163 rocket-propelled aircraft, 1 May 45, typed transcript, 170.2281-31, in USAF Collection, AFHRA, Maxwell AFB, Alabama, 3.
6. Ethell and Price, 60-61.
7. Galland, *The First and the Last*, 356.
8. Ethell and Price, 60.
9. The Diagram Group, *Weapons*, New York: St Martin's Press, Inc, 1980, 253.
10. Alfred Price, *Luftwaffe Handbook 1939-1945*, New York: Charles Scribner's Sons, 1977, 50.
11. Price, 53.
12. Ethell and Price, 106-115.
13. Interview of Dr Ing Hermann Lorenz (RLM), *Information on Natter German Rocket Interceptor*, 7 May 45, typed transcript, 170.2281-30, in USAF Collection, AFHRA, 1.
14. Joachim Dressel, *Natter Ba-349*, Atglen, Pennsylvania: Schiffer Publishing, Ltd, 1994, 20.
15. Diagram Group, 243.
16. James F. Dunnigan and Albert A. Nofi, *Dirty Little Secrets of World War II*, New York: William Morrow and Company, Inc, 1994 54.
17. Diagram Group, 253.
18. Williamson Murray and Allan R. Millett, *A War to Be Won*, Cambridge, Massachusetts, The Belknap Press of Harvard University Press, 1983, 600.
19. Dunnigan and Nofi, 54.
20. David Irving, *The Rise and Fall of the Luftwaffe: The Life of Field Marshal Erhard Milch*, Boston: Little, Brown, and Company, 1973, 373.
21. Generalfeldmarschall Erhard Milch, *An Apologia for the Defeat and Deficiencies of the Luftwaffe*, 15 Nov 45, 570.619B, in USAF Collection, Air Force Historical Research Center, Maxwell AFB, Alabama, 1. Milch states Hitler gained much of his aviation knowledge from his personal pilot, who was not much of an aviator or strategic expert. Hitler, not for the first time, trusted a close personal assistant instead of his true experts.
22. Galland, *The First and the Last*, 340.
23. Galland, *The First and the Last*, 331.
24. Irving, 232.
25. Irving, 219.
26. Galland, *The First and the Last*, 334.
27. Irving, 281.
28. Galland, *The First and the Last*, 314-315.
29. Irving, 298.
30. Richard Overy, *Why the Allies Won*, New York: W. W. Norton & Company, Inc, 1995, 202.
31. Overy, 201.

## German Wonder Weapons: Degraded Production and Effectiveness

32. Overy, 201-202.
33. *Ibid.*
34. I. B. Holley, "Some Concluding Insights," *Air Superiority*, ed, B. Franklin Cooling, Washington DC, Center for Air Force History, 1994, 616.
35. Williamson Murray, *Strategy for Defeat of the Luftwaffe 1933-1945*, Maxwell AFB, Alabama: Air University Press, 1983, 5.
36. Irving, 335.
37. Murray, 6.
38. W. A. Jacobs, "Operation Overlord," *Air Superiority*, ed, B. Franklin Cooling, Washington, DC: Center for Air Force History, 1994, 275.
39. Overy, 240.
40. Murray and Millett, 535.
41. Overy, 204.
42. Price, 89.
43. Galland, *The First and the Last*, 352.
44. Interrogation of General Lieutenant Galland, *Special Weapons for Combating Four-Engine Bombers by Day with Single Engine and Twin Engine Fighters*, 14 Sep 45, typed transcript, 570.619A, in USAF Collection, AFHRA, Maxwell AFB, Alabama, 7. Ethell and Price cite similar information on pages 47 and 59, as does Perrett on page 253.
45. Hugh Morgan and John Weal, *German Jet Aces of World War II*, London: Osprey Publishing, 1998, 25.
46. Interrogation of German PoWs, ADI (K) Report No 44A/1944, *Hs 293 Radio Controlled Bomb*, 28 Dec 43, typed transcript, 512.6522, in USAF Collection, AFHRA, Maxwell AFB, Alabama, 3. Report No 1534 in the same location gives information on the FX radio-controlled bomb, gathered from eyewitness accounts of an attack and examination of a crashed Do-217K-3 and unexploded FX bombs in England.
47. Interview of Reichsmarshal Herman Goering, no date, typed transcript 570.619, in USAF Collection, AFHRA, Maxwell AFB, Alabama, 1.
48. Stephen L. McFarland and Wesley Phillips Newton, "The American Strategic Air Offensive Against Germany in World War II," *Case Studies in Strategic Bombing*, ed, R. Cargill Hall, Washington DC: US Government Printing Office, 1998, 204.
49. Morgan and Weal, 27-28.
50. William Green, *The Warplanes of the Third Reich*, Garden City, New York: Doubleday and Company, Inc, 1970, 641.
51. Green, 519.
52. Bruce D. Callander, "The Jet Generations," *Air Force Magazine*, 85, 10, Oct 02, 70.
53. Geoffrey Perrett, *Winged Victory*, New York: Random House, 1993, 411.
54. Irving, 244.
55. The Editors of Time-Life Books, *The Luftwaffe*, Alexandria, Virginia, Time-Life Books, 1982, 168.
56. Jacobs, 275.
57. Price, 64.
58. McFarland and Newton, 195.
59. Murray, 254.
60. Galland, 357-358.
61. Price, 64.
62. McFarland and Newton, 237. Overy (*Why the Allies Won*, 321) also states that by Sep 44, 80 percent of the Luftwaffe fighter force was based in Germany for antibomber missions.
63. Murray and Millett, 332.
64. Jacobs, 304.
65. Jacobs, 306.
66. Murray and Millett, 334
67. Overy, 118.
68. Perrett, 293.
69. Galland, 356.
70. Morgan and Weal, 9.
71. Galland, 318.

---

## German Wonder Weapons: Degraded Production and Effectiveness

72. Galland, 356.
73. John Keegan, *The Second World War*, New York: Penguin Books USA, Inc, 1989, 582.
74. Murray and Millett, 600.
75. Dunnigan and Nofi, 54. Keegan cites similar numbers.
76. H. E. Bates, *Flying Bombs Over England*, Westerham, Kent, England: Froglets Publications Ltd, 1994, 156.
77. Keegan, 582.
78. Gunston, 103.
79. Dunnigan and Nofi, 212.
80. Price, 89.
81. Interrogation of German PoWs, A.D.I. (K) Report No 2246, *German Flying Bomb* (no date, typed transcript, 512.6521, in USAF Collection, Historical Research Agency, Maxwell AFB, Alabama, 1. Also contains information from examination of downed and captured V1s.
82. Dunnigan and Nofi, 211.
83. War Department Memo, HQ AAF, *German Pilotless Aircraft*, 8 Jul 44, 142.0423-5, in USAF Collection, AFHRA, Maxwell AFB, Alabama, 3.
84. Price, 89.
85. Crossbow report, *Study: Flying Bomb and V2 Rocket*, 8 Jan 45, 142.0423-4, in USAF Collection, AFHRA, Maxwell AFB, Alabama, 3.
86. Keegan, 581.
87. Earl R. Beck, *Under the Bombs*, Lexington, Kentucky: The University Press of Kentucky, 1986, 115-116.
88. Crossbow, 1.
89. Bob Ogley, *Doodlebugs and Rockets, The Battle of the Flying Bombs*, Froglets Publications Ltd, 1992, 50.
90. Overy, 239-240.
91. Report from Captured Personnel and Materiel Branch, US War Department Intelligence Division, *Trends in Development of German Weapons for Countering Allied Bombers*, 5 May 45, 170.2281-23, in USAF Collection, AFHRA, Maxwell AFB, Alabama, 2.
92. Dieter Holsken, *V-Missiles of the Third Reich, the V1 and V2*, Sturbridge, Massachusetts, Monogram Aviation Publications, 1994, 245-256.
93. Holsken, 261-262.
94. Overy, 240.
95. John A. Tirpak, "The Force Seeks a New Baseline," *Air Force Magazine*, 86, No 1, Jan 03, 40.
96. Tirpak, 39.
97. Benjamin S. Lambeth, *The Transformation of American Air Power*, Ithaca, New York: Cornell University Press, 2000, 305.
98. Donald H. Rumsfeld, "Transforming the Military: Riding into the Future," *National and International Security Studies*, Maxwell AFB, Alabama: Air Command and Staff College, 2002, 147.
99. "Long Arm of the Air Force," *Air Force Magazine* 85, No 10, Oct 02, 30.
100. "Long Arm of the Air Force," 31.
101. "Long Arm of the Air Force," 33.
102. Lambeth, 303.
103. HQ USAF XPXT, "The USAF Transformation Flight Plan, In *Joint Force Employment*, Maxwell AFB, Alabama: Air Command and Staff College, 2003, 54.
104. Rumsfeld, 149.
105. Rumsfeld, 145.
106. James G. Roche, "Transforming the Air Force," *Joint Force Employment*, Maxwell AFB, Alabama: Air Command and Staff College, 2003, 10.
107. Maj T. W. Beagle, "Effects-Based Targeting: Another Empty Promise?" in *Air and Space Operations*, Maxwell AFB, Alabama: Air Command and Staff College, 2002, 77.
108. Murray and Millett, 534.
109. Lambeth, 320.
110. Irving, 334-335.

## Major General Orvil Anderson

Anderson was born in Springville, Utah, in 1895. He left Brigham Young University and enlisted in the Aviation Section of the Army Signal Corps on 23 August 1917.



**Major William Kepner, Captain Albert Stevens, and Captain Orvil Anderson**

Anderson would sometimes remind people usually found that his aviation career began in World War I. "This is where I entered," he would reminisce, "and I admit that I entered just because I wanted to fly an airplane. Anderson gained fame as one of the top balloonists in the country. He achieved an altitude record for balloons in 1935 that lasted for 22 years and won him both the Harmon and Mackay trophies. Although he gained fame as the nation's top balloonist, he realized the future of military air was not in lighter-than-air flight. After converting to airplanes and flying for several years, Anderson was assigned to the Plans Division on the Air Staff. In 1943, he moved to England to become the chief planner of the Eighth Air Force; the following year he was promoted to major general and made director of operations for the Eighth. As the war in Europe was drawing to a close, he was chosen as the senior military advisor to the US Strategic Bombing Survey for both the European and Pacific divisions. In this capacity, he had a number of arguments with the Navy over who played the most important role in the defeat of Japan.

At the end of World War II, he faced another turning point. Believing his future lay in developing new generations of Air Force thinkers, he agreed in 1946 to become the founding commandant of the Air War College. However, soon after the outbreak of the Korean war, Anderson told a newspaper reporter that Russia was clearly behind the invasion of South Korea and that given the order he would be willing to wipe out Russia with atomic strikes within a week. Because inappropriate statements had been made only a few days before by Douglas MacArthur and the Secretary of the Navy, earning rebukes from President Truman, Anderson's comments were especially inopportune. Within days, he was relieved of his command and pushed into retirement in December 1950. In 1954, he returned to Maxwell AFB as executive director of the Air Force Historical Foundation, the organization which he believed could "contribute to the efficacy of the airpower mission by enhancing the scope of national comprehension and rekindling an esprit de corps in all airmen." Anderson died on 23 August 1965.

[Online] Available: <http://www.af.mil/bios/bio.asp?bioID=4529>; <http://www.arlingtoncemetery.net/oanderson.htm>; and <http://www.airpower.maxwell.af.mil/airchronicles/cc/and.html>.



## Introduction

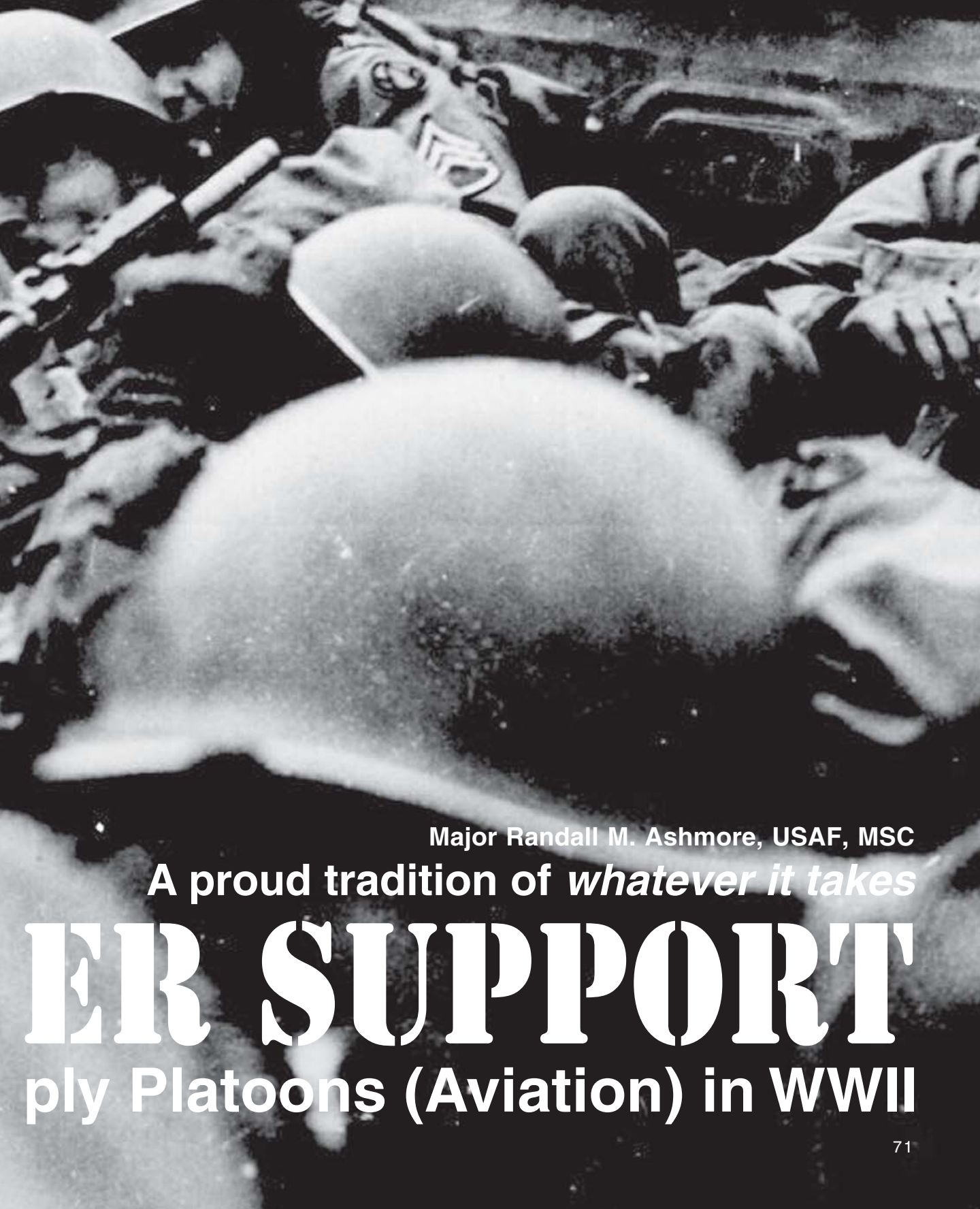
Air Force medical logisticians have a motto—*Whatever It Takes*. This motto epitomizes the commitment to excellence that Air Force medical logisticians exhibit when supporting the Air Force Medical Service. In both peacetime and wartime, medical logisticians are the ones who make it possible for the Medical Service to accomplish its mission. From purchasing and distributing pharmaceuticals and expendable medical supplies to the management of medical equipment and medical facilities, the *Log Dogs* of the Medical Service are literally the foundation of quality healthcare.

Although vitally important in peacetime, medical logistics is even more important in wartime. One critical aspect of an effective military force is its health. In wartime, an unfit, unhealthy force will not be very effective. Moreover, that force's ability to care for its sick and wounded during wartime could possibly tip the scales between victory and defeat, and the mission of caring for the sick and wounded rests with that force's medical service. The

# WARFIGHT

## Medical Sup





Major Randall M. Ashmore, USAF, MSC

A proud tradition of *whatever it takes*

# ER SUPPORT

ply Platoons (Aviation) in WWII

## Warfighter Support: Medical Supply Platoons (Aviation) in WWII



*We are unsung about, extremely unheard of, and perhaps unrecognized as a factor to be accounted for.*

responsibility of ensuring that the Medical Service has all the equipment and supplies to accomplish its mission rests with the medical logisticians.

Much has been written on the medical support provided to the Army Air Forces (AAF) in World War II. Much of this historical record deals with the provision of patient care and the medical aspects of the support provided by the compassionate and dedicated physicians, nurses, and medical technicians (as it probably should be). However, the foundation of that support, medical logistics, often is overlooked and usually only mentioned when problems were encountered.<sup>1</sup> As one medical supply platoon history so eloquently pointed out, “We are unsung about, extremely unheard of, and perhaps unrecognized as a factor to be accounted for.”<sup>2</sup> This article will attempt to fill that gap and provide the reader with a look into and an appreciation for the *heavy lifting* (literally) that went on behind the scenes by medical supply platoons (aviation). As a case in point, just one hospital in World War II was noted as using “90 miles of gauze, 12,000 pounds of plaster of Paris, 3,600 cans of ether, and over 2,000 liters of normal saline” in 1944 alone.<sup>3</sup> It took a lot of dedication and hard work on the part of these medical supply platoons to feed that insatiable appetite for medical supplies and equipment. It was that dedication and hard work that made the level of medical care provided to the Army Air Forces in World War II possible.

Unfortunately, describing the contributions of all medical supply platoons (aviation) during World War II is beyond the scope of this article. As a result, this article focuses only on the medical supply platoons that served in the Mediterranean and European theaters of operation. Additionally, it will focus only on a few of the platoons that served in these theaters and kept good historical records. This, obviously, may ignore the contributions other platoons may have made during this time period. Medical supply platoons (aviation) served in the Pacific theater of operations as well, and their contributions definitely warrant further study. Nevertheless, because of limits in time and space, efforts had to be focused on the platoons in certain theaters and with good unit histories.

To that end, this article begins by defining what a medical supply platoon (aviation) is and describes where it fit into the logistics system of the time. The organization, mission, people, and equipment that make up one of these medical supply platoons will be outlined. Then the reader will be taken through contributions that several medical supply platoons made in the Mediterranean and European theaters, from North Africa, Sicily, Italy, and southern France to England, northern France, and Germany. It will then conclude with some lessons that modern day Air Force medical logisticians can learn from those *Log Dogs* that came before us.

### Medical Supply Platoon (Aviation): What is it?

The medical supply platoon (aviation) was originally created under Table of Organization (T/O) 8-497, 3 June 1942.<sup>4</sup> This T/O consisted of 2 medical administrative corps (MAC) officers and 19 enlisted persons. The organization normally was attached to an air depot group in which the

medical supply platoon (aviation) was responsible for procuring, storing, and issuing medical supplies to the various units it was assigned to support.<sup>5</sup> In early 1942, the medical supply platoon (aviation) was created and tested and “demonstrated its value for supplying medical equipment to rapidly moving combat air squadrons independently of the Services of Supply in forward areas where the latter had no depots.”<sup>6</sup> The air depot group was assigned to an air force general depot that was, in turn, assigned to the Air Service Command.<sup>7</sup>

Additionally, the medical supply platoon (aviation) was organized internally with three functional sections: administrative, storage, and records. The administrative section was charged with purchasing or requisitioning medical supplies, preparing necessary reports, and overseeing the administrative needs of the platoon. The storage section’s responsibility was the receiving, storing, and issuing of medical supplies. Finally, the records section was responsible for preparing receiving reports, shipping tickets, inventories reports, and so forth. With everything being typed on old-fashioned typewriters, this was a daunting task.

As mentioned previously, under T/O 8-497, the medical supply platoon (aviation) was assigned 2 MAC officers and 19 enlisted personnel. The officers consisted of one captain as the platoon commander and one second lieutenant as the administrative officer. The 19 enlisted persons, whose rank ranged from private to staff sergeant, and their duties are listed below:

- Chief clerk (one)
- Clerk, receiving and shipping (one)
- Clerk, technical (one)
- Pharmacist (technician grade 4) (one)
- Clerk, receiving, and shipping (technician grade 4) (one)
- Clerk, technical (technician grade 4) (two)
- Chauffeur (four)
- Clerk, general (two)
- Clerk, technical (four)
- Packer, shipping (two)

The platoon was reorganized under Table of Organization and Equipment (T/O&E) 8-497 in July 1943, which changed distribution of personnel amongst the various duties (decreased one chauffeur and increased one packer, shipping) but did not change the overall number of people in the platoon.<sup>8</sup>

In addition to being organized under T/O 8-497, the medical supply platoon (aviation) was allotted its organizational equipment under Table of Basic Allowance (T/BA) 8, 15 July 1942.<sup>9</sup> The T/BA listed all equipment and supplies the organization was allowed to have. While a listing of all the equipment here is not warranted, the platoon was authorized chemical warfare, engineer, ordnance, quartermaster, motor

Warfighter Support: Medical Supply Platoons (Aviation) in WWII

Introduction ..... 70

Medical Supply Platoon (Aviation): What is it? ..... 72

Mediterranean Theater of Operations ..... 74

European Theater of Operations ..... 83

Lessons for Today’s Air Force Medical Logician ..... 90



---

## Warfighter Support: Medical Supply Platoons (Aviation) in WWII

*Germany's focus on defense left it little capability to conduct offensive operations to truly hurt the Allies. Determined Axis resistance to the Torch landings resulted in the necessity to increase Allied forces in North Africa.*

transport, signal, and individual and organizational medical equipment. The motor transport equipment included one ¾-ton 4X4 command and reconnaissance truck, one ¾-ton 4X4 weapons carrier, and one 2½-ton 6X6 cargo truck with winch. This equipment was slightly changed when the platoon was reorganized, as mentioned previously, under T/O&E 8-497. The ¾-ton command and reconnaissance truck was replaced with a ¼ ton truck (jeep), and the 2½ -ton cargo truck was replaced with a 1½-ton cargo truck with winch.<sup>10</sup>

The amount of medical supplies and equipment that the unit carried depended on the number of troops serviced. The normal amount was 20 tons of supplies and equipment for 30,000 troops for 30 days. Although I could not find the exact listing of medical supplies carried by the platoon, from inventory reports submitted by many of these units, it consisted of approximately 1,100 items.<sup>11</sup>

As can be seen from the above discussion of the organization of a medical supply platoon (aviation), it is a relatively small but capable unit—a unit capable of supporting many organizations with medical supplies and equipment during wartime. Although organizationally capable of fulfilling this task, it would be the dedication and hard work of the personnel assigned to these platoons that would push the capabilities of these small units to new heights. The contributions of medical supply platoons (aviation) in the Mediterranean theater of operations serve as a good case in point.

### Mediterranean Theater of Operations

On 8 November 1942, the Allies launched Operation Torch, the invasion of North Africa. The invasion consisted of three task forces: Western, Center, and Eastern. The Western Task Force was to land at Casablanca, Center Task Force at Oran, and the Eastern Task Force at Algiers with the overall objective of defeating the Afrika Korps in North Africa and capturing the port city of Tunis.<sup>12</sup> This landing operation was supported by the newly formed Twelfth Air Force, commanded by Brigadier General “Jimmy” Doolittle.<sup>13</sup>

Germany's focus on defense left it little capability to conduct offensive operations to truly hurt the Allies. Determined Axis resistance to the Torch landings<sup>15</sup> resulted in the necessity to increase Allied forces in North Africa. “Air Force strength rose by leaps and bounds and, with this rise, occurred a multiplication of the problems already faced by the Air Force Surgeon's Office.”<sup>16</sup> One of these problems was medical supply. During the planning for Torch, it was decided that there would be no hospitals attached to the Air Force and medical supply would be a unit problem.<sup>17</sup> As a result, the increase in AAF forces in the theater put an even greater strain on medical supply to AAF units. To help relieve that pressure, more medical supply platoons (aviation) were sent into the theater. One of these units would be the 3<sup>d</sup> Medical Supply Platoon (Aviation).

The 3<sup>d</sup> was activated as a medical supply detachment, Third Air Force and redesignated as the 3<sup>d</sup> Medical Supply Platoon (Aviation) 5 June



---

## Warfighter Support: Medical Supply Platoons (Aviation) in WWII

1942 at Drew Field, Tampa, Florida. On 23 December 1942, the unit received *warning orders* for overseas shipment. Five days later, on 28 December, the unit, consisting of 1 officer and 19 enlisted men, boarded a train to Trenton, New Jersey, where it arrived on 31 December at 0300. The unit then proceeded by bus to Fort Dix, New Jersey, arriving at 0500 the same day, where the men received physical examinations and inoculations. After anxiously awaiting actual movement, the unit departed Fort Dix for the New York Port of Embarkation on 7 February 1943 and boarded the Army transport *Argentina* and departed for overseas on 8 February.<sup>18</sup>

On 19 February, the unit arrived at the Port of Casablanca, Morocco, North Africa, and then moved again via plane from Casablanca to La Senia Airfield in Algeria. After getting settled in and organized, the 3<sup>d</sup> set up shop and started operating as a medical supply platoon with the Air Force General Depot #1 on 18 March 1943.<sup>19</sup>

The platoon created its warehouse in half of an aircraft hangar that was approximately 2,700 square feet and part of an annexed building that was about 400 square feet. This space was very limited when the number of units this small platoon was servicing is taken into consideration.

Among the groups serviced by this unit were several service centers, airbases, Air Force ordnance depots, Air Force chemical depots, Signal Aircraft Warning Battalions, Regional Air Defense Units, fighter, bomber, service, and air depot groups, and all detachments assigned or attached to these main groups, including numbered medical detachment dispensaries. In addition to these, this unit supplied other medical supply platoons in forward areas, took care of the medical needs for transient aircraft, and provided a Lend-Lease to the Air Force units of the British and Allied governments.<sup>20</sup>

From March to May 1943, during the Tunisian campaign, the platoon issued more than 31 tons of medical supplies to an average of 36 units a month. This consisted of more than 300 requisitions for approximately 4,500 line items.<sup>21</sup> The Surgeon, II Air Service Area Command and the Commanding Officer, II Air Service Area Command, in a letter dated 3 May 1943, recognized this effort.

*From March to May 1943, during the Tunisian campaign, the platoon issued more than 31 tons of medical supplies to an average of 36 units a month.*

1. The 3<sup>d</sup> Medical Supply Platoon, comprised of 1 officer and 19 enlisted men, has been responsible for the procurement, storage, issuing, and shipment of a large quantity of medical supplies as far east as the Tunisian border. Records, this headquarters, indicate that over 43,000 pounds have been shipped forward in this manner. These medical supplies were urgently needed by units in the eastern area.

2. At the present time, the organizations in this area have medical supplies delivered to their individual dispensaries within a maximum of 48 hours following receipt of routine requisition. In case of emergency, this has been reduced to a few hours.

3. In summary, your attention is invited to the expeditious, cooperative, and efficient manner in which the 3<sup>d</sup> Medical Supply Platoon (Aviation) has performed its duty of supplying medical items to Air Corps units in this theater.

---

## Warfighter Support: Medical Supply Platoons (Aviation) in WWII

*After moving 19 enlisted men, 2 officers, and 40 tons of medical supplies and equipment three times in 5 days, the platoon was ready to set up operations.*

This has been accomplished in a manner to reflect great credit upon Lieutenant Marmelstein and every member of his organization.<sup>22</sup>

In addition to receiving glowing letters of appreciation, the platoon also passed its inspections with flying colors. On 1 October 1943, the platoon received a rating of *Superior* for an inspection completed in September by the Administrative Inspector, II Air Service Area Command.<sup>23</sup> The outstanding performance of the 3<sup>d</sup> Medical Supply Platoon would not end with its support of the Tunisian campaign. Although stationed in North Africa, this platoon also would provide support for the campaigns in Sicily and Italy.

On 10 July 1943, the Allies invaded the island of Sicily in Operation Husky.<sup>24</sup> The 3<sup>d</sup> supported the buildup and the actual operation by issuing approximately 25 tons of medical supplies, consisting of approximately 330 requisitions for 2,300 line items.<sup>25</sup>

Troop carrier commands, bomb and fighter groups which participated in the Sicilian campaign, were issued special supplies for this mission by this platoon ... seven complete medical dispensaries were assembled and shipped to the forward area; in addition to this, medical supplies were shipped to other medical supply platoons (aviation) in the forward area.<sup>26</sup>

One of the other medical supply platoons that may have been supported in the forward area during this time was the 2<sup>d</sup> Medical Supply Platoon (Aviation), which landed on the island of Sicily to support operations there and in Italy after a short stay in Casablanca. The 2<sup>d</sup> departed the New York Port of Embarkation on 12 December, arriving in Casablanca, Morocco, on Christmas Eve 1942. The platoon made bivouac near the Cazes Airport, a 4-mile march from the point of debarkation. On 13 January, the platoon marched back to Casablanca where it found a building to set up operations.<sup>27</sup>

In just 2 days, the platoon requisitioned, received, and organized enough medical supplies to support 10,000 men for 30 days. On 15 January, the platoon was “in operation issuing medical supplies to Air Force units, consisting of bombardment groups, fighter groups, service groups, and attached units.”<sup>28</sup> But the platoon’s hard work would not end there. Unlike the 3<sup>d</sup>, the 2<sup>d</sup> would not stay in North Africa for very long. From 29 July to 23 August 1943, the platoon moved from Casablanca to the Bizerte, North Africa, port of embarkation. During this time, the platoon requisitioned enough medical supplies to maintain 25,000 men for 30 days—approximately 40 tons of supplies. On 24 August, the platoon and its supplies and equipment set sail arriving at Augusta, Sicily, 26 August. Once in Augusta, the platoon proceeded via motor convoy to Palermo, Sicily, arriving August.<sup>28</sup> Finally, the platoon departed Palermo on 30 August and arrived at its final destination of Catania, Sicily, on 31 August.<sup>29</sup> After moving 19 enlisted men, 2 officers, and 40 tons of medical supplies and equipment three times in 5 days, the platoon was ready to set up operations.

## Warfighter Support: Medical Supply Platoons (Aviation) in WWII

After arriving in Catania, the platoon was again ready for operation in just 2 days. The platoon selected a building for a warehouse that “was formerly an apartment house with tile floors, wooden paneled doors, and the usual decorative plaster ceilings found in Sicily.”<sup>30</sup> From this austere location, the platoon started servicing units in the area. “Kerosene lanterns were used for light, though daylight at this time of year was sufficient for ordinary depot operations.”<sup>31</sup> Nevertheless, from 2 to 23 September 1943, the platoon filled 44 routine and 79 emergency requisitions and 275 pharmaceutical prescriptions, which consisted of an estimated 400 line items totaling 6 tons. Additionally, the platoon was able to fill 95 percent of the authorized items requisitioned. But just when the platoon thought it would stay put for a while, it again packed up and moved back to Palermo on 2 October 1943.

Upon arriving back in Palermo, the platoon again was ready for operation within a few days. Operations were set up in a building formerly used by an Italian artillery unit that at least had municipal electricity for lighting. During the month of October, the platoon filled 107 routine and 45 emergency requisitions and 386 pharmaceutical prescriptions that totaled an estimated 500 line items.<sup>32</sup>

The 2<sup>d</sup> stayed located in Palermo, Sicily, from 2 October 1943 to 14 July 1944. During this period, the platoon filled 689 routine, 262 emergency requisitions, and 2,413 pharmaceutical prescriptions, totaling approximately 3,745 line items, with a total estimated weight of 47 tons.<sup>33</sup> Considering the conditions that the platoon was operating in, this was quite a feat. But the fun was not over. On 14 July 1944, the platoon again packed up its supplies and equipment—consisting of 1,200 separate items totaling 501 pieces, weighing 18.6 long tons, totaling 1,984.8 cubic feet<sup>34</sup>—and headed for Italy to help several other medical supply platoons (aviation) that were supporting operations in Italy.

On 3 September 1943, the Allies invaded the Italian peninsula with General Bernard Montgomery’s forces crossing the straits between Sicily and Italy and landing at Reggio.<sup>35</sup> Five days later, on 9 September, Allied forces landed at Salerno and Taranto. By October 1943, the Allied armies had advanced and captured Naples and the airfields at Foggia, allowing the Twelfth Air Force to start moving bombers and their escorts to the Bari and Foggia area and fighters, fighter-bombers, and medium bombers to the Naples area.<sup>36</sup> As a result, the AAF units operating out of those areas were going to need medical supply support from units such as the 14<sup>th</sup> Medical Supply Platoon (Aviation).

The 14<sup>th</sup> departed for overseas on the Army transport *Thomas H. Barry* on 19 August 1943, arriving at Bizerte, Tunisia, on 4 September. The platoon staged at the Sidi Ahmed Airport until 15 October when 1 officer and 17 enlisted men and approximately 15 tons of medical supplies and equipment were flown to Bari, Italy, to set up operations.<sup>37</sup>

Upon arrival in Bari, the platoon was unexpectedly tasked with the huge job of inventorying, packing, and shipping approximately 74 tons of medical supplies that inadvertently had been left behind by the ground

*Upon arrival in Bari, the platoon was unexpectedly tasked with the huge job of inventorying, packing, and shipping approximately 74 tons of medical supplies that inadvertently had been left behind by the ground forces beneath piles of tentage and other supplies.*

---

## Warfighter Support: Medical Supply Platoons (Aviation) in WWII

*No one in the platoon was injured in the attack, and the unit's warehouse suffered only minor damage with some broken windows and so forth.*

forces beneath piles of tentage and other supplies. As a result, the platoon's job:

... was to completely inventory the medical supplies, prepare necessary shipping tickets, and reload it aboard the *S.S. Franklin* at the Bari docks. It was, indeed, a gigantic task for 15 enlisted men and 1 officer .... Three days and three nights, the terrific job lasted... all but some 20 tons were reloaded by the ship's sailing time.<sup>38</sup>

After completing this Herculean task, the platoon set up operations and began filling requisitions to supported units in the area. After operating in this location for only 2 weeks, the unit was directed to move to the other side of town on 30 October (while still filling requisitions). Within a week after the move, the unit had its new warehouse roughly 90 percent complete and in full operation at Air Force General Depot No 5. But the platoon was not through moving yet. It was determined that the location in Bari was not close enough to the units that were being supported in Foggia. As a result, the platoon moved its operations again, on 29 November, to a building in Foggia that was "very badly battered... with rubble, filth, and broken glass heaped all about it."<sup>39</sup>

Undaunted, the advance party of the platoon set out to make the new warehouse in Foggia fit for operations. These men, medical logisticians not civil engineers, "demonstrated their proficiency and versatility by acting as carpenters, plumbers, electricians, stone-masons... they installed sinks, toilets, urinals, and electric lights. Doors and windows replaced jagged, irregular holes and smashed sashes in the walls. Shelving for warehousing the medical supplies was constructed."<sup>40</sup> In addition to the moving and building of a new warehouse, the part of the unit still in Bari found itself under air attack on 2 December, with one bomb landing within 100 yards of its warehouse. The unit history states:

On 2 December, there was an enemy air attack!! Bombers roared into Bari at extremely low level without warning and proceeded to shower it with bombs. Terrific explosions shook the earth as the town shuddered and shook. Smashed, twisted, and badly mauled buildings were silent, grim reminders of the terrific blast, which followed a direct hit on an ammunition ship in the harbor.<sup>41</sup>

No one in the platoon was injured in the attack, and the unit's warehouse suffered only minor damage with some broken windows and so forth. Nevertheless, even with the moving and getting bombed, from arrival until the end of 1943, the platoon managed to service the strength of approximately 25,000 men and fill 100 routine and 35 emergency requisitions and 50 pharmaceutical prescriptions, totaling approximately 1,000 line items per month.<sup>42</sup>

From January to June 1944, the platoon operated in Foggia, Italy, without moving. The strength supported by the unit almost tripled, increasing to approximately 70,000 troops. During this time, it averaged filling 800 routine and 150 emergency requisitions and 800 pharmacy prescriptions totaling 1,600 line items per month.<sup>43</sup> But the platoon was joined by other medical supply platoons supporting operations there.

---

## Warfighter Support: Medical Supply Platoons (Aviation) in WWII

As mentioned previously, in July 1944, the 2<sup>d</sup> departed Palermo and arrived in Pomigliano, Italy, on 20 July. For the entire month of August 1944, the platoon was awaiting further orders and spent the time remarking boxes and repairing or replacing any items damaged in the movement.<sup>44</sup> Finally, on 14 September 1944, the platoon received orders and loaded all its medical supplies onto two freight cars at the Castel Nuova railhead. The platoon's personnel and equipment departed Pomigliano on 18 September via motor convoy headed for Pisa, Italy, arriving on 20 September.<sup>45</sup> The unit war diary for September 1944 describes part of the trip.

19 September—Everyone rose at 0530, and the last of the convoy departed at 0830. Favorable weather and good roads continued. Bivouac was made north of Gossetto at 1500. It is planned to break camp at 0300 tomorrow morning. The first drop of rain fell at 2000, presaging difficulties later on.

20 September—The camp was awakened at 0200, and those who had managed to keep dry were forced to fold cots and blankets in the rain and mud. At 0330, the last of the convoy was on the way. Pisa Airfield was reached at 0900, and the various outfits settled in buildings a few miles away. It rained throughout the day, and everyone was grateful for a roof overhead.<sup>46</sup>

After this wonderful trip, all the platoon's equipment was unloaded from three trucks and trailers, and it proceeded to find a building suitable for medical supply operations. Like the brethren in the 14<sup>th</sup> in Bari, the platoon would find out that the Germans were not surrendering without a fight. On 23 September, between 2200 and 2300, the Germans shelled the city of Pisa with artillery, while the platoon readied its new facility for operations. On 24 September, the platoon received the supplies that were put on the train at Pomigliano and loaded six trailers and six trucks at the railhead and departed for the new warehouse. But once again, the Germans made their presence known by shelling the city for an hour with "shells landing about one every 10 minutes."<sup>47</sup> If shelling was not bad enough, "a 500-pound dud aerial bomb resting in one corner of the courtyard [of the platoon's warehouse building] was removed by Lieutenant Songaylo of the 1721<sup>st</sup> Ordnance, much to everyone's relief."<sup>48</sup> Nevertheless, the platoon was ready for full operations by October.

From October through the rest of 1944, the platoon issued 20.68 tons of medical supplies, consisting of 376 routine and 197 emergency requisitions and 1,492 pharmaceutical prescriptions. From January to June 1945, the platoon would issue an additional 73.78 tons of medical supplies. One thousand four hundred sixty-seven requisitions and 2,460 pharmaceutical prescriptions would be filled and filled completely 95 to 98 percent of the time.<sup>49</sup> But these platoons were not the only ones providing critical support to the Army Air Forces on the Italian peninsula.

The Bari area was being serviced by the 26<sup>th</sup> Medical Supply Platoon (Aviation) and had an impressive record of performance. From June to December 1944, the 26<sup>th</sup> serviced approximately 100 different units. The platoon issued approximately 1,357.5 tons of medical supplies to

*One thousand four hundred sixty-seven requisitions and 2,460 pharmaceutical prescriptions would be filled and filled completely 95 to 98 percent of the time*



---

## Warfighter Support: Medical Supply Platoons (Aviation) in WWII

*Operation Dragoon commenced on 15 August 1944 with airborne and amphibious landings between Cannes and Toulon.*

supported units from June to December 1944, which averaged 194 tons of supplies issued per month.<sup>50</sup>

During this time of the Italian campaign, the 3<sup>d</sup> (back in Algeria) was gearing up to move as well. After being in La Senia, Algeria, from 19 February 1943 to 20 May 1944, the 3<sup>d</sup> packed up and was destined for the island of Corsica. But before the platoon left La Senia, one of the members penned a poem that depicts what its time was like while stationed there.

We call ourselves "The Fightin' Third,"  
With all our pills it's quite absurd;  
For we've no arms to fight the Huns,  
Just aspirin tabs, we've got no guns.

Of eighteen months we've know so well,  
These thirteen last have been in hell;  
We left our homes to ease men's pains,  
That all might fight, and fly the planes.

Of all supplies we pass on by,  
The one that causes longing sighs  
Is whiskey for the combat crews  
(And not for us whom we would choose).

With hearts so light, abroad, one day  
We came in love, but now today,  
We've almost all become a part  
Of that big club—"The Broken Heart."

At movies we're the first ones set,  
The same for chow, and you can bet  
When come that homeward-going time,  
We'll be the very first in line!<sup>51</sup>

The 3<sup>d</sup> would be on the island of Corsica in inactive status from 27 May to 19 August 1944 for some well-deserved rest, reequipping, and training. But that inactivity would end with its departure from Corsica on 23 August 1944 to support the invasion of southern France and Operation Dragoon.

Operation Dragoon commenced on 15 August 1944 with airborne and amphibious landings between Cannes and Toulon.<sup>52</sup> The purpose of those landings was to create another port of entry into France for Allied troops to support the landings that had taken place in Normandy in June 1944.<sup>53</sup> The XII Tactical Air Command accompanied this invasion and provided the necessary air support.<sup>54</sup> As a result, the AAF forces would require medical supply support, which would be provided by the 3<sup>d</sup> Medical Supply Platoon (Aviation).

After its stay on Corsica, the platoon received word on 18 August that the unit would be loading up and heading to southern France. The weather on Corsica this day did not help the loading efforts.

---

## Warfighter Support: Medical Supply Platoons (Aviation) in WWII

Today, we had one of the hardest rains that it had been our misfortune to be under.... Every man held onto his cot to keep it from floating away and to act as an anchor for himself so that he would not be swept into the fast-moving current. During this turbulent storm, seven empty trucks arrived from the Trucking Co for our supplies. As soon as the rain let up, the men loaded seven trucks with medical supplies.<sup>55</sup>

On 19 August, the platoon loaded 4 more trucks with medical supplies, and a convoy of 13 trucks departed for the staging area at Ile Rousse, Corsica. After unloading the trucks at the docks, the platoon set up camp at the bivouac area and turned in, "sleeping out under the star-studded sky, with nothing between our blankets and the sky except our mosquito nets, and each man hoping that it would not rain during the night."<sup>56</sup>

On 22 August, the platoon loaded all its gear onto a truck and proceeded to the port at 2230 to load onto an LST. "As it usually happens, there were no trucks at midnight, and the LST did not arrive until 0400. The men slept on top of the boxes of medical supplies, on top of the truck, and on the ground."<sup>57</sup> Finally, at 1500 hours on 23 August, the platoon and its supplies were loaded and the LST pulled out of the harbor at 2200 hours.

On 24 August, the platoon arrived in Southern France at *Green Beach*. After unloading some Signal Corps equipment and supplies, the LST headed back out en route to *Red Beach*. But while en route, the platoon would find itself performing an open-sea LST to LCT transfer of supplies and equipment. The unit's war diary describes the effort.

We pulled away from green beach and headed out to sea and then to red beach. When near red beach, one harbor Naval Officer told us to land the boat. Three minutes later, another officer came aside of us and told the ship's captain to drop anchor and that an LCT would be out and take the supplies aboard. This meant another extra time of handling the supplies, and the morale of the men went down. The LCT pulled alongside, and we immediately began to transfer the supplies by crane and nets. Part of the men would load the nets down in the hold of the LST while the rest of the men were on the LCT taking the supplies from the nets and stacking them in orderly fashion....At last the work was finished, and the LCT headed for shore. Here a convoy of 13 trucks took our supplies from the port to the 332<sup>d</sup> Service Group Area.<sup>58</sup>

*The men slept on top of the  
boxes of medical supplies,  
on top of the truck, and on  
the ground.*

After this tiring experience, the platoon completed unloading all the supplies at 0100 at the 332<sup>d</sup> and made camp nearby in Frejus, France.

On 1 September, the platoon found out it would be attached to the 38<sup>th</sup> Air Depot Group, and that group was making preparations to move to Marseilles, France. On 4 September, the platoon again loaded the supplies and equipment and headed to Marseilles. The trip that day would be an exciting one, and the platoon would literally enter Marseilles with a bang. About 10 minutes outside the city, the platoon was involved in a traffic accident with its weapons carrier and its 2½-ton truck.

We saw our own 2½ ton truck bearing down on us....There was a loud crash, a screeching of brakes, and a lot of bouncing around caused when the 2½ ton truck rammed our weapons carrier in the back. We all hopped out of the truck, a bit shaken and bruised, but nothing very serious. Everyone seemed to be feeling fine, with the exception of Lieutenant Johnson [their commanding

---

## Warfighter Support: Medical Supply Platoons (Aviation) in WWII

*This was the first time the platoon had operated a pharmacy since its activation, and it would prove to be a big business and require much teamwork during the stay in southern France.*

officer], who we noticed began to turn white and started to sag to the ground but was caught in time by Sergeant Piellucci and Sergeant Wanczowski.<sup>59</sup>

Fortunately, Lieutenant Johnson was not seriously injured and, after a short stay at a dispensary, he rejoined the platoon, along with its vehicles (the 2½-ton truck towing the weapons carrier). The platoon's war diary stated, "This is one day that we will not forget, and it had to happen on our first day in Marseilles. The 38<sup>th</sup> Supply Squadron is located in a large RR yard, and it is here that we intend to set up our medical supply warehouse. We spent the night sleeping on the station platform, tired and weary after a hectic day."<sup>60</sup>

After that eventful trip, the platoon would spend the next few days readying the new warehouse for operations by cleaning up the building and building shelves to house all the supplies. On 7 September, the platoon finally completed trucking all its supplies from Frejus and continued to set up medical supply operations while filling requisitions from supported units.<sup>61</sup>

On 10 September, the warehouse was completed and ready for operations, and the platoon reached a milestone when the first prescription was filled by its newly constructed pharmacy. This was the first time the platoon had operated a pharmacy since its activation, and it would prove to be a big business and require much teamwork during the stay in southern France. For example, on 12 September:

The 332<sup>d</sup> Service Group submitted eight requisitions for medical supplies and prophylactic materials. It was necessary for some of the men to return to work after supper in order that these requisitions could be filled, because the 332<sup>d</sup> was moving out of the area and the supplies were needed urgently. With the requisitions, there were also included many pharmaceutical preparations, which took a good deal of time to prepare. Lieutenant Johnson has now learned another profession, that of being a pharmacist. He rendered his assistance in the preparation of some of the pharmaceuticals that the 332<sup>d</sup> had requested.<sup>62</sup>

Again, on 14 September, the unit's war diary states:

The pharmacy section has been very busy since the day it started functioning. To catch up with some of the work, Sergeant Wanczowski and Sergeant Butz, our pharmacist, remained after work to prepare enough mixtures and ointments of items of great demand so as to have them ready for issue upon request. A great deal of work was accomplished that evening, with plenty of full bottles of pharmaceutical ready for dispensing.<sup>63</sup>

The platoon only would stay in southern France until 7 October 1944, but it would be the *only* medical supply platoon (aviation) supporting operations in southern France during this time. During its time in southern France, the platoon would load or unload supplies and equipment 14 times while servicing a high of 84 units, which included 70 Air Force units and 14 ground force units. The unit would fill a total of 141 requisitions (59 routine and 82 emergency) and prepare 267 pharmaceutical preparations. This would include a total of 1,079 line items, which were filled 88.66 percent of the time.<sup>64</sup>

---

For its efforts, the platoon again would receive a letter of appreciation from the commander of the 38<sup>th</sup> Air Depot Group with which it served in southern France and Algeria. A portion of the letter reads:

1. I desire to express our appreciation to each and every one of you and to commend you for the outstanding manner of performance of duty during the period you were assigned to and worked with this organization.

2. We are particularly mindful of that space of time in which we operated together during the initial stages of the southern France campaign in the establishment of Air Force Depot 1789, at a time when your invaluable assistance, your loyalty and cooperation, your quick response to our every need did much toward the construction of a depot, which was capable of operating effectively and efficiently from the very first day of its establishment.

3. It is with a great measure of regret that we note your departure, the loss of your platoon.... It would be, however, a source of distinct pleasure if final victory were to find us working side by side once again, lending what help we are capable of in bringing about the lasting destruction of the enemy.<sup>65</sup>

After its support of the southern France operations, the platoon would be heading to Italy to help support operations there. But the Mediterranean theater of operations would not be the only theater in which medical supply platoons (aviation) would make an impact. Several platoons would provide critical support operations in the European theater of operations in England, France, and Germany.

## European Theater of Operations

In 1942, the newly formed Eighth Air Force started building up forces in England to start the bombing of Germany and start preparations for the invasion of France in 1944.<sup>66</sup> An important part of this buildup and preparation was the provision of medical care to the troops that would be prosecuting the German bombing campaign and eventual invasion. Colonel (soon to be Brigadier General) Malcolm Grow, who was appointed as the Air Surgeon, Eighth Air Force, was to lead this effort of building up medical support for the Eighth Air Force.<sup>67</sup>

One of the major problems the Air Surgeon's staff immediately ran into was the efficient and effective procurement and distribution of medical supplies and equipment for Eighth Air Force units. The Air Surgeon's staff turned to the medical supply platoon (aviation) to help remedy the state of affairs in medical supply and equipment procurement, storage, and distribution. As a result, "The number [of medical supply platoons (aviation)] in operation increased from two at the end of 1942 to nine at the close of the next year."<sup>68</sup> One of the first medical supply units to be sent to England was the 6<sup>th</sup> Medical Supply Platoon (Aviation).

The 6<sup>th</sup> departed from Boston, Massachusetts, on 27 April 1942 bound for England and arriving on 12 May. On 15 June 1942, the platoon would arrive at its final destination of Thrapston, England, later to be known as AAF Station 584. The platoon established itself at the Ideal Clothiers factory site in Thrapston and set up operations. The small platoon was

## Warfighter Support: Medical Supply Platoons (Aviation) in WWII

*One of the first medical supply units to be sent to England was the 6<sup>th</sup> Medical Supply Platoon (Aviation).*

---

## Warfighter Support: Medical Supply Platoons (Aviation) in WWII

*In all, 200 haversacks, supplying 6,000 pounds of medical items, would be transported ashore.*

quite busy during this time because, until November 1942, it was the *only* medical distributing point in operation in England. The unit history describes some of the difficulties encountered.

These early days presented a real task in procurement and distribution of medical supplies to ground and combat units of the Eighth Air Force and SOS organizations. Unmarked roads, lack of suitable vehicles for operations, nonavailability of supplies, participation in local defense plans in cooperation with Home Guard units due to imminent invasion possibility, and lack of office and warehouse equipment, all presented what appeared to be insurmountable tasks, but like all other operations, which marked this whole European war picture, requiring leadership, perseverance, spirit, sweat, and a sense of humor, they were overcome in stride.<sup>69</sup>

Additionally, the platoon would play a major role in supporting the North African invasion discussed previously. Its contribution would be in the form of building and supplying modified British haversack medical kits to the North African invasion forces. This modified British haversack was the idea of the Eighth Air Force Air Surgeon's staff to try and solve the initial medical supply problems that the North African invasion forces would face upon landing. "The haversack contained 30 pounds of essential medical supplies and was to be carried by medical officers and enlisted men in the ratio of one haversack for every three men. In all, 200 haversacks, supplying 6,000 pounds of medical items, would be transported ashore."<sup>70</sup> All 200 of these innovative haversacks would be packed and distributed by the 6<sup>th</sup>.

In addition to performing the normal role of medical supply and distribution, the platoon also would be involved in a unique exercise named Lilford, a German invasion scenario, which took place on 4 October 1942. British Lieutenant R. F. Cooper, who was the commander of a company of the 3<sup>d</sup> Battalion Home Guard, provides a description of the exercise:

Oundle and the surrounding villages were in the defending D Company area under Major Jones, who was reinforced by 30 American medics under the command of Lieutenant Peterson [the 6<sup>th</sup> Medical Supply Platoon's commanding officer].

The Americans were to defend the north of the town between Oundle Road and the footbridge over the gravel pits. Positions were taken at 0930, but no sign of the enemy was reported until 1030 when it was reported that enemy patrols were advancing along the east side of the river and along the railway line.

By 1100, these two patrols were under fire from the 6<sup>th</sup> Medical Supply Platoon (Avn) as well as the Mobile Platoon, under my command, who had been called in to reinforce the attack from the north. The Americans were dug in well-prepared foxholes and held their fire until the enemy was well within range. By so doing, they captured the entire patrol coming over the bridge and accounted for casualties and wounded among the railway patrol.

In my opinion, the work of the Yanks in breaking up the main enemy patrols was largely responsible for putting the enemy to rout early in the attack.<sup>71</sup>



---

## Warfighter Support: Medical Supply Platoons (Aviation) in WWII

The platoon's participation and performance in the exercise would be further praised by Cooper's commanding officer, Major C. R. Jones, who wrote:

The US detachment, although not strictly fighting troops, entered into the scheme wholeheartedly. They were given the job of defending an area stretching from their own HQ on an important road into the town, right across to the River Nane. Their defences were admirably placed, and Lieutenant Peterson had the satisfaction of seeing his men deal very thoroughly with the enemy, so much so that not a single man got through their area! Nothing but praise can be given for the enthusiasm with which they set about their job, and one could easily realize what short shift *Jerry* would get should he be foolish enough to drop in to see them.<sup>72</sup>

It seems that the 6<sup>th</sup> was not only good at medical supply but also quite a tenacious and aggressive fighting unit when it came to encountering the *enemy*.

The platoon would receive some relief from being the sole medical supply distribution point in England with the arrival of other medical supply platoons (aviation) into the area. But the platoon would be charged with training most of the other platoons that came to England and ensuring their indoctrination into Eighth Air Force supply procedures. The 6<sup>th</sup> would train the 1<sup>st</sup>, 10<sup>th</sup>, 37<sup>th</sup>, and 46<sup>th</sup> Medical Supply Platoons (Aviation), which would, in turn, open additional medical supply distribution points for the Eighth Air Force. Nevertheless, from June 1942 to October 1944, the 6<sup>th</sup> still managed to fill approximately 10,275 requisitions in support of Eighth Air Force operations and preparations for the invasion of Normandy.<sup>73</sup> This was something the platoon took great pride in, as the unit history points out.

Situated in the heart of heavy bomber country, daily the personnel of this station have the opportunity to see, realize, and fully appreciate their contributions to the welfare of the VIII Air Force combat crews as their aircraft mass overhead. Their contribution in the form of medical supplies (that is, aeronautical and parachutist first aid kits) is carried as standard equipment by crew members and machines. And again, upon return of crippled bombers, they have the personal satisfaction of knowing that equipment distributed by them is waiting to succor the wounded.<sup>74</sup>

Another unit that arrived in England to help with the medical supply situation was the 20<sup>th</sup> Medical Supply Platoon (Aviation), which arrived in England 14 January 1943. On 2 February, the platoon would arrive at its final destination at AAF station 590 located in Lancashire. This platoon would encounter the same difficulties of the 6<sup>th</sup>, which would include having to do some innovative construction work to set up operations at the new site.

There were 19 nissen huts and 3 cement block buildings, 11 along the west side of the site and 9 along the east side. The grounds and buildings had to be repaired, policed, painted, and shelving built from old mess benches and lined with 2-inch wood strips. Strong-room was built for narcotics, instruments, and sulfa drugs. Both of these were accomplished by the EM of this unit. To permit trucks to get to the buildings with and for supplies, roads had to be

*The 6<sup>th</sup> was not only good at medical supply but also quite a tenacious and aggressive fighting unit when it came to encountering the enemy.*

---

## Warfighter Support: Medical Supply Platoons (Aviation) in WWII

*While some of the platoons would stay in England and support operations throughout the war, several platoons would arrive in England to support the buildup and participate in invasion operations.*

built. There were approximately 250 loads of cinders for road surface. This work was far enough along and advanced so that by February 8<sup>th</sup> were able to receive our initial stock from G14 in Liverpool.<sup>75</sup>

With this hard work and innovative setup, the platoon was ready for operations by 11 February and filled its first requisition on that same day. The platoon worked in conjunction and trained with the 31<sup>st</sup> Medical Supply Platoon (Aviation) until August 1943 when it took over the medical supply operations at AAF Station 590. The commander of the 401<sup>st</sup> Air Depot Group recognized the 20<sup>th</sup> in a letter of appreciation. A portion of the letter reads:

I desire to take this opportunity to commend you and the other officers and men under your command, for the excellent manner in which you have utilized the meager facilities at hand in making your site a clean, neat, and attractive place.

It is thoroughly appreciated that, in making the improvements you did, it was necessary to use both men and officers on work of a nature not normally expected of technically trained personnel. I am told that these men and officers accepted the situation in the best of spirit. It is this spirit throughout your organization which is in accordance with the best traditions of the American Army, and I congratulate you on having a command composed of such men.<sup>76</sup>

While some of the platoons would stay in England and support operations throughout the war, several platoons would arrive in England to support the buildup and participate in invasion operations. One such platoon was the 11<sup>th</sup> Medical Supply Platoon (Aviation). The 11<sup>th</sup> arrived in England in November 1943. After several movements between stations, the platoon finally arrived at AAF Station 404 in March 1944 and went right to work and servicing “all or parts of seven (7) Service Groups plus Signal Aircraft Warning Battalions, Engineer Camouflage Battalions, and other units assigned to the IX Air Force Service Command.”<sup>77</sup> In addition to supporting these units, the platoon moved operations from permanent buildings at AAF Station 404 into “two (2) Romey huts and four (4) hospital ward tents”<sup>78</sup> without interruption to operations. But in May 1944, the platoon would receive alert orders for another movement—across the English Channel into France.

“The alert order stipulated that a forty-five (45) day supply level for thirty thousand (30,000) troops and two (2) thirty (30) day pickups for field hospitals would be taken. This was estimated to be sixty-six (66) long tons of equipment and supplies.”<sup>79</sup> However, packing operations would be interrupted by a German air raid on 10 May 1944. Eight bombs were dropped on the station by a German bomber with no injuries to personnel. But after that, “Everyone was a little faster jumping out of bed and getting to shelter.”<sup>80</sup> Nevertheless, the platoon completed all the packing and was ready to move at a moment’s notice.

Finally, in July 1944, the platoon loaded all its supplies and equipment onto the LST *Empire Rapier* and departed for the coast of France. Within

---

## Warfighter Support: Medical Supply Platoons (Aviation) in WWII

a couple of days after reaching the coast of France, the platoon was set up for operations at Strip A-9 and was supplying all the advanced echelons of the Ninth Air Force and many smaller organizations in the area. The platoon received “several favorable commendations from higher headquarters for the good work done, both in operation and in setting up the installation.”<sup>81</sup> But the platoon would not stay put for long. On 19 August, the platoon would pack up its supplies and equipment again and depart for Strip A-35 at Le Mans, eventually arriving at Strip A-42 at Villacoublay.

The platoon arrived at Strip A-42 on 2 September and was operational on 8 September where it would be “operating under canvas for 1 week, then moving into buildings. This move was accomplished without cessation of operations.”<sup>82</sup> It did not cease operations even though September would be a record month for the platoon. “The month of September saw the largest turnover in stock the unit has had since activation. Approximately four (4) hundred vouchers were handled in twenty-two (22) operational days. The main reason for this increased activity lay in the fact that one-third of the issue was to ground force installations.”<sup>83</sup> At the close of 1944, the platoon had been operational 275 days and completed 2,875 transactions. In addition, the unit’s pharmacy had filled 615 pharmaceutical preparations that included 1,586 quarts of cough syrup, 287 quarts of nose drops, 219 quarts of Calamine lotion, and 180 pounds of APC powders.<sup>84</sup>

But the 11<sup>th</sup> would be joined by other medical supply platoons that would prepare for and participate in operations in France. The 1<sup>st</sup> (after being trained by the 6<sup>th</sup>) set up operations at AAF Station 403, supporting units attached to the 2<sup>d</sup> Advanced Air Depot located in Kingston. While there, the platoon performed an *experiment in mobility* that would prove to come in handy in the future.

All stocks of supplies previously placed in shelved boxes were packed, loaded, moved, unloaded, and set up in an attempt to determine the length of time required to move the installation safely. The amount of time required to pack up, load, and then set up at a new location, exclusive of time required in the actual movement, is estimated at thirty-six (36) hours.<sup>85</sup>

The experiment in mobility mentioned above would prove valuable when the platoon was alerted for movement in July. From July to October 1944, the platoon would move from England to Omaha Beach; to Cherbourg; to Normandy; to Strip A-27 southwest of Rennes; to Strip A-42 Villacoublay; and finally, Strip A-64 in St Dizier, France. As a result, the platoon would be awarded battle credit for the Normandy Campaign and Campaign Northern France and receive the Meritorious Service Unit Plaque.<sup>86</sup>

Another platoon that was trained by the 6<sup>th</sup> and would see action in France and Belgium was the 10<sup>th</sup> Medical Supply Platoon (Aviation). After training with the 6<sup>th</sup>, the 10<sup>th</sup> Medical Supply Platoon (Aviation) set up operations at AAF Station 169, servicing four to five times the troop strength that the platoon was designed to support.<sup>87</sup> Nevertheless, the

*The platoon performed an experiment in mobility that would prove to come in handy in the future.*

---

## Warfighter Support: Medical Supply Platoons (Aviation) in WWII

*On 8 May 1945, the German High Command finally surrendered to the Allies*

platoon, in preparation for operations in France, improved the requisitioning processes, and for the month of May 1944, “the processing of requisitions was reduced from three (3) days to one (1) day.”<sup>88</sup> This improvement would prove to be essential to supporting units in Belgium.

On 21 October 1944, the 10<sup>th</sup> arrived in Liege, Belgium, where it set up operations and was filling requisitions to supported units in only 2 days. During its time in Liege, the platoon’s operations would be temporarily interrupted when a German V-1 rocket attack on the city of Liege completely destroyed the enlisted men’s quarters. Luckily, there were no casualties, and the platoon quickly resumed operation in support of operations on the Continent. One of the most famous operations on the Continent that medical supply platoons (aviation) would help support during this time is the Battle of the Bulge in December 1944.

Although still in England, the 71<sup>st</sup> Medical Supply Squadron (Aviation) would play a critical role in helping supply the besieged 101<sup>st</sup> Airborne Division at Bastogne. Activated in August 1944 at Membury, the platoon was tasked with servicing the entire IX Troop Carrier Command and associated units that would be the organization charged with airdropping supplies to the beleaguered 101<sup>st</sup> troops in Bastogne. The Troop Carrier Command “participated in four combat resupply operations... flown on December 23, 24, 26, and 27. Their objective was the resupplying of the 101<sup>st</sup> located in the Bastogne area in Belgium.”<sup>89</sup> In these four missions, the IX Troop Carrier Command would fly 180 aircraft and deliver more than 872,000 pounds in supplies to the troops in Bastogne.<sup>90</sup> Supplying the medical supplies for these operations would be the job of the 71<sup>st</sup> that would support these operations in its first month of operation. Nevertheless, “many organizations of IX Troop Carrier Command being serviced by this unit needed medical supplies, expendable and nonexpendable. Both were speedily furnished by telephone corroboration or oral requisitions.”<sup>91</sup>

With the successful repulse of the German offensive that was Hitler’s last grasp for victory in Europe, the Allies had the German Army on the run, and on 8 May 1945, the German High Command finally surrendered to the Allies. The unit history of the 36<sup>th</sup> Medical Supply Platoon (Aviation), which was in Belgium, describes the moment.

...on the 8<sup>th</sup> of May 1945 [the] attitude changed to one of jubilation when the official announcement [of surrender] was made. The civilian population immediately started to celebrate and were joined by the military personnel. Dancing in the town square and drinking was the main order. A full day was given to the men to join in the festivities planned by the civilians. This was short-lived, however, for instructions were received, making this organization a part of a redeployment system set up on a nearby airfield.<sup>92</sup>

The end of the war in Europe ended hostilities, but the redeployment of troops and supplies was just beginning. Many of the medical supply platoons (aviation) in Europe and the Mediterranean would find themselves handling much of the disposition of the tons of medical supplies that were in theater and the reequipping of units for redeployment.

---

Back in England, the 20<sup>th</sup> found itself in the middle of the redeployment, as well being the only medical distributing point still in operation in England in July 1945.

With redeployment underway, this headquarters has become the main installation for the receipt and storage of all medical supplies.... Since this point is the only one in operation at the present time, it has also been our task to supply the stations still operating that are in the VIII and IX Air Forces, and the subsequent receipt of medical equipment upon the cessation of operations at any of these stations.<sup>93</sup>

In September 1945, the platoon would clear out operations and send 116,729 pounds of medical supplies to the 3<sup>d</sup> in Germany. Approximately 35 truckloads of supplies were shipped to Depot M-424.<sup>94</sup>

The 3<sup>d</sup>, now in Illesheim, Germany, was just as busy with redeployment activities receiving supplies from other organizations that were preparing for inactivation or redeployment.

October was a month of steady work for the 3<sup>d</sup> Medical Supply Platoon.... Two rail cars were loaded and returned to Medical Depot M-418 near Rheims, France, and enough equipment has been processed to load two more cars. Just at the time that order was being forced out of the chaos...17 truckloads [of supplies] were dumped on our dock and in the warehouse. Undaunted, the enlisted men rallied to the demand and have processed the majority of this equipment. October was a busy month, but one in which all personnel could take satisfaction in having met a situation almost impossible and knowing that they were greater than the task that faced them.<sup>95</sup>

For the rest of 1945, most of the medical supply platoons (aviation) in the European and Mediterranean theaters would be either supporting redeployment operations, inactivated, and sent back to the United States or supporting units tasked with occupation duties. No matter what the future entailed, all these units could be extremely proud of the support they provided to the Air Force Medical Service and other Allied units. These small but capable units filled tens of thousands of requisitions and moved thousands of tons of medical supplies to support the AAF and Allied forces. They accomplished all this while moving over land and sea, making suitable warehouses out of bombed-out buildings or whatever they could find, living in incredibly austere conditions, and avoiding the occasional bombing and artillery attacks. Nevertheless, they persevered and proved that they were definitely “greater than the task that faced them.”

And the task that faced them was indeed great. In World War II, the medical materiel required by the Allies was enormous. It involved more than 7,000 standard medical items and many nonstandard. From inexpensive tongue depressors to costly x-ray machines, more than a billion dollars of medical supplies and equipment were purchased from 1 July 1941 to 30 June 1945 and could fill a train 400 miles long.<sup>96</sup>

The small medical supply platoons (aviation) did their part in ensuring the vast amount of medical materiel described above was efficiently and effectively brought to bear against the enemy of disease and injury. It was the platoon members’ hard work, dedication, devotion, and willingness

## Warfighter Support: Medical Supply Platoons (Aviation) in WWII

*These small but capable units filled tens of thousands of requisitions and moved thousands of tons of medical supplies to support the AAF and Allied forces.*



---

## Warfighter Support: Medical Supply Platoons (Aviation) in WWII

*The fast movement of the AAF and Allied forces in World War II made mobility of the logistics tail a must.*

to do *whatever it took* to make possible the outstanding medical support provided to a portion of the more than 14 million<sup>97</sup> patients treated during World War II. Because, in the end, “however fine the doctor or skilled the surgeon, both were helpless without the drugs and instruments flowing uninterrupted through the smoothly organized channels of medical supply.”<sup>98</sup>

### Lessons for Today’s Air Force Medical Logistician

The contributions made by the medical supply platoon (aviation) units to the outstanding medical support provided to the Army Air Forces in World War II are numerous. However, there are a few lessons and enduring themes that today’s Air Force medical logisticians can take away from the study of these contributions. Those lessons are the importance of mobility, teamwork, and innovation.

The fast movement of the AAF and Allied forces in World War II made mobility of the logistics *tail* a must. As the AAF units moved in World War II, so moved their logistics infrastructure, including their medical support. As a result, the medical supply platoon (aviation) had to keep pace and move quickly as the Army Air Forces moved forward. This was accomplished through sheer brute force that involved the moving of literally mountains of medical materiel to keep the rapidly moving AAF medical units supplied with their lifesaving equipment and supplies. These platoons were providing agile combat support before that term became Air Force doctrine. Its footprint may have been large by today’s standards, but these platoons were definitely agile. While we no longer have to move mountains of medical supplies to support our units, medical logisticians still need to focus on the importance of mobility in today’s expeditionary environment.

Today’s Air Force expeditionary medical support is definitely *light, lean, and lifesaving*. We have taken much of the bulk out of our medical support assemblies that resulted in the Air Force Medical Service’s being able to provide quicker response and more capability with a smaller footprint. As such, Air Force medical logisticians must ensure the logistics tail that supports that capability is as mobile as is required by whatever operation we are supporting. We may be called on to move operations to another location quickly and be set up within limited timeframes to support expeditionary medical operations. We need to ensure our logistical support is mobile enough to move with the operations if necessary. Additionally, as medical logisticians, it is our job to ensure any changes or updates to medical support assemblies (both clinical and support) are evaluated in terms of mobility and how that change affects the assembly’s mobility, as well as the logistical mobility (that is, sustainment).

The second lesson that came out of this research is the importance of teamwork. The medical supply platoons (aviation) in World War II depended on the teamwork not only of their members but also amongst the platoons themselves. The supply clerks helped the pharmacy

---

## Warfighter Support: Medical Supply Platoons (Aviation) in WWII

technicians, the pharmacy technicians helped the supply clerks, and everyone chipped in and helped with the heavy lifting involved with warehousing, loading, unloading, inventorying, and so forth. These units would not have been able to accomplish what they did without that teamwork. Moreover, the platoons routinely assisted each other, trained each other, and forged relationships even if they were not within the same organization. They knew that lives depended on their working together, and they did whatever it took to ensure each platoon was able to accomplish its mission.

Although Air Force medical logisticians are well-known for their teamwork, in today's environment of *doing more with less*, teamwork takes on even more importance. As a result, working together with other Air Force logisticians, other service medical logisticians, and the clinical side of the medical support equation will become more and more important as the number of people decreases but missions increase. Air Force medical Q to leverage our heritage of teamwork and set the example when called on to make it happen.

Finally, the medical supply platoon (aviation) units in World War II demonstrated the importance of innovation. These platoons often were faced with having to make do with whatever they had at very austere locations. They made warehouses out of bombed buildings; shelving out of boxes, plywood, or metal sheeting; and quarters out of loading docks, bombed buildings, or whatever they could find and used whatever means at their disposal to get supplies to their supported units. In today's expeditionary environment, we may find ourselves at a bare base somewhere with very little, if any, support infrastructure. As a result, the medical logisticians will be relied on to be innovative to ensure the medical mission is accomplished no matter what the conditions. Additionally, today, we have many tools at our disposal such as supply chain management, intransit visibility, just-in-time ordering, and other technology-dependent methodologies. However, in the end, it will be the innovation on the part of the medical logistician on the ground to make things happen if those tools ever fail. It will be their dedication and willingness to do *whatever it takes* that will make the difference between mission success and failure.

*Air Force medical logisticians need to leverage our heritage of teamwork and set the example when called on to make it happen.*

### Notes

1. Hubert A. Coleman and Mae Mills Link, *Medical Support of the Army Air Forces in World War II*, Washington DC, Office of the Air Force Surgeon General, 1955.
2. Unit History, 39<sup>th</sup> Medical Supply Platoon (Aviation), Air Force Historical Research Agency (AFHRA), Maxwell AFB, Alabama.
3. Richard V. N. Ginn, *The History of the US Army Medical Service Corps*, Washington, DC, Office of the Surgeon General of the Army, 1997, 143.
4. T/O 8-497, War Department, Washington DC, 3 Jun 42.
5. Army Air Forces Regulation 65-1, *Supply and Maintenance of Army Air Force Units*, 14 Aug 42.
6. Charles M. Wiltse, *Organization and Administration in World War II*, Washington DC, Office of the Surgeon General, Department of the Army, 1963, 138.
7. War Department Field Manual 100-20, *Command and Employment of Air Power*, 21 Jul 43.

---

## Warfighter Support: Medical Supply Platoons (Aviation) in WWII

8. T/O&E 8-497, War Department, Washington DC, 26 Jul 43.
9. T/BA 8, War Department, Washington DC, 15 Jul 42.
10. T/O&E 8-497, War Department, Washington DC, 31 Dec 44.
11. Unit History, 3<sup>d</sup> Medical Supply Platoon (Aviation), Mar 43, AFHRA, Maxwell AFB, Alabama.
12. Dwight D. Eisenhower, *Crusade in Europe*, Baltimore: Johns Hopkins University Press, 74-94.
13. Richard G. Davis, *Carl A. Spaatz and the Air War in Europe*, Washington DC: Center for Air Force History, 1993, 126.
14. Goeffery Perret, *Winged Victory: The Army Air Forces in World War II*, New York: Random House, 1993, 183.
15. John Keegan, *The Second World War*, New York: Penguin Books, 1989, 341-343.
16. Coleman and Link, 426.
17. Coleman and Link, 421.
18. Unit History, 3<sup>d</sup> Medical Supply Platoon, 5 Jun 42 to 5 Sep 43, AFHRA, Maxwell AFB, Alabama.
19. Unit History, 3<sup>d</sup> Medical Supply Platoon (Aviation), 1 Jul 44 to 30 Sep 44, AFHRA, Maxwell AFB, Alabama.
20. 3<sup>d</sup> Medical Supply Platoon (Aviation), 1 Jul 44 to 30 Sep, 3.
21. Unit History, 3<sup>d</sup> Medical Supply Platoon (Aviation), 1 Jan 44 to 31 Mar 44, AFHRA, Maxwell AFB, Alabama.
22. Unit History, 3<sup>d</sup> Medical Supply Platoon (Aviation), 5 Sep 43, AFHRA, Maxwell AFB, Alabama.
23. *War Diary*, 3<sup>d</sup> Medical Supply Platoon (Aviation), Oct 43, AFHRA, Maxwell AFB, Alabama.
24. S.W.C Pack, *Operation Husky: The Allied Invasion of Sicily*, New York: Hippocrene Books, 1977.
25. 3<sup>d</sup> Medical Supply Platoon (Aviation), 1 Jan 44 to 31 Mar 44.
26. 3<sup>d</sup> Medical Supply Platoon (Aviation), 5 Sep 43.
27. Unit History, 2<sup>d</sup> Medical Supply Platoon (Aviation), Mar 42 to Sep 43, AFHRA, Maxwell AFB, Alabama.
28. 2<sup>d</sup> Medical Supply Platoon (Aviation), Mar 42 to Sep 43, 4.
29. Unit History, 2<sup>d</sup> Medical Supply Platoon (Aviation), Aug 43 to Jul 44, AFHRA, Maxwell AFB, Alabama.
30. 2<sup>d</sup> Medical Supply Platoon (Aviation), Aug 43 to Jul 44, 2.
31. 2<sup>d</sup> Medical Supply Platoon (Aviation), Aug 43 to Jul 44, 3.
32. *Ibid.*
33. 2<sup>d</sup> Medical Supply Platoon (Aviation), Aug 43 to Jul 44, 3-5.
34. 2<sup>d</sup> Medical Supply Platoon (Aviation), Aug 43 to Jul 44, 5.
35. Williamson Murray and Allan R. Millett, *A War to Be Won: Fighting the Second World War*, Cambridge, Massachusetts: Harvard University Press, 2000, 378.
36. Coleman and Link, 430.
37. Unit History, 14<sup>th</sup> Medical Supply Platoon (Aviation), 15 Oct to 15 Nov 43, AFHRA, Maxwell AFB, Alabama.
38. 14<sup>th</sup> Medical Supply Platoon (Aviation), 15 Oct to 15 Nov 43, 2.
39. Unit History, 14<sup>th</sup> Medical Supply Platoon (Aviation), 15 Nov to 15 Dec 43, AFHRA, Maxwell AFB, Alabama, 2.
40. *Ibid.*
41. *Ibid.*
42. Unit History, 14<sup>th</sup> Medical Supply Platoon (Aviation), 31 Dec 43, AFHRA, Maxwell AFB, Alabama.
43. Unit History, 14<sup>th</sup> Medical Supply Platoon (Aviation), 1 Jan to 30 Jun 44, AFHRA, Maxwell AFB, Alabama.
44. *War Diary*, 2<sup>d</sup> Medical Supply Platoon (Aviation), Aug 44, AFHRA, Maxwell AFB, Alabama.
45. Unit History, 2<sup>d</sup> Medical Supply Platoon (Aviation), 1 Aug 43 to 30 Sep 1944, AFHRA, Maxwell AFB, Alabama.

---

## Warfighter Support: Medical Supply Platoons (Aviation) in WWII

46. *War Diary*, 2<sup>d</sup> Medical Supply Platoon (Aviation), Sep 44, AFHRA, Maxwell AFB, Alabama.
47. *War Diary*, 2<sup>d</sup> Medical Supply Platoon (Aviation), Sep 44, 3.
48. Unit History, 2<sup>d</sup> Medical Supply Platoon (Aviation), 1 Oct to 31 Dec 44, AFHRA, Maxwell AFB, Alabama.
49. 2<sup>d</sup> Medical Supply Platoon (Aviation), 1 Oct to 31 Dec 44, 3-6.
50. *War Diary*, 26<sup>th</sup> Medical Supply Platoon (Aviation), Jun to Dec 44, AFHRA, Maxwell AFB, Alabama.
51. Unit History, 3<sup>d</sup> Medical Supply Platoon, Feb 44, AFHRA, Maxwell AFB, Alabama.
52. Keegan, 361.
53. Eisenhower, 281.
54. Davis, 484.
55. *War Diary*, 3<sup>d</sup> Medical Supply Platoon (Aviation), Aug 44, AFHRA, Maxwell AFB, Alabama.
56. *War Diary*, 3<sup>d</sup> Medical Supply Platoon (Aviation), Aug 44, 8.
57. *War Diary*, 3<sup>d</sup> Medical Supply Platoon (Aviation), Aug 44, 10.
58. *Ibid.*
59. *War Diary*, 3<sup>d</sup> Medical Supply Platoon (Aviation), Sep 44, AFHRA, Maxwell AFB, Alabama.
60. 3<sup>d</sup> Medical Supply Platoon (Aviation), Sep 44, 3.
61. 3<sup>d</sup> Medical Supply Platoon (Aviation), Sep 44, 4.
62. 3<sup>d</sup> Medical Supply Platoon (Aviation), Sep 44, 7.
63. 3<sup>d</sup> Medical Supply Platoon (Aviation), Sep 44, 8.
64. Unit History, 3<sup>d</sup> Medical Supply Platoon (Aviation), 1 Jul to 30 Sep 44, AFHRA, Maxwell AFB, Alabama.
65. *Ibid.*
66. Davis, 71.
67. Link and Coleman, 535.
68. Link and Coleman, 539.
69. Unit History, 6<sup>th</sup> Medical Supply Platoon (Aviation), 27 Jul 45, AFHRA, Maxwell AFB, Alabama.
70. Link and Coleman, 422.
71. *Unit History*, 6<sup>th</sup> Medical Supply Platoon (Aviation), Oct 44, AFHRA, Maxwell AFB, Alabama.
72. *Ibid.*
73. *Ibid.*
74. 6<sup>th</sup> Medical Supply Platoon (Aviation), Oct 44, 1-2.
75. Unit History, 20<sup>th</sup> Medical Supply Platoon (Aviation), 25 Nov 42 to 1 Feb 44, AFHRA, Maxwell AFB, Alabama.
76. *Ibid.*
77. Unit History, 11<sup>th</sup> Medical Supply Platoon (Aviation), Mar 44, AFHRA, Maxwell AFB, Alabama.
78. *Ibid.*
79. Unit History, 11<sup>th</sup> Medical Supply Platoon (Aviation), May 44, AFHRA, Maxwell AFB, Alabama.
80. 11<sup>th</sup> Medical Supply Platoon (Aviation), May 44, 2.
81. Unit History, 11<sup>th</sup> Medical Supply Platoon (Aviation), Jul 44, AFHRA, Maxwell AFB, Alabama.
82. Unit History, 11<sup>th</sup> Medical Supply Platoon (Aviation), Sep 44, AFHRA, Maxwell AFB, Alabama.
83. *Ibid.*
84. Unit History, 11<sup>th</sup> Medical Supply Platoon (Aviation), Dec 44, AFHRA, Maxwell AFB, Alabama.
85. Unit History, 1<sup>st</sup> Medical Supply Platoon (Aviation), Apr 44, AFHRA, Maxwell AFB, Alabama.
86. Unit History, 1<sup>st</sup> Medical Supply Platoon (Aviation), Aug 44, AFHRA, Maxwell AFB, Alabama.

---

## Warfighter Support: Medical Supply Platoons (Aviation) in WWII

87. Unit History, 10<sup>th</sup> Medical Supply Platoon (Aviation), Mar 44, AFHRA, Maxwell AFB, Alabama.
88. Unit History, 10<sup>th</sup> Medical Supply Platoon (Aviation), Jun 44, AFHRA, Maxwell AFB, Alabama.
89. Unit History, IX Troop Carrier Command, Dec 44, AFHRA, Maxwell AFB, Alabama, 1.
90. IX Troop Carrier Command, Dec 44, 2.
91. Unit History, 71<sup>st</sup> Medical Supply Platoon (Aviation), Feb 45, AFHRA, Maxwell AFB, Alabama.
92. Unit History, 34<sup>th</sup> Medical Supply Platoon (Aviation), Jun 45, AFHRA, Maxwell AFB, Alabama.
93. Unit History, 20<sup>th</sup> Medical Supply Platoon (Aviation), Jul 45, AFHRA, Maxwell AFB, Alabama.
94. Unit History, 20<sup>th</sup> Medical Supply Platoon (Aviation), Sep 45, AFHRA, Maxwell AFB, Alabama.
95. Unit History, 3<sup>d</sup> Medical Supply Platoon (Aviation), Oct 45, AFHRA, Maxwell AFB, Alabama.
96. Charles M. Wiltse, *Medical Supply in World War II*, Washington DC: Office of the Surgeon General, Department of the Army, 1968, ix.
97. *Ibid.*
98. Wiltse, *Medical Supply in World War II*.



## Major General Malcolm C. Grow

Grow was born in Philadelphia, Pennsylvania, 19 November 1887 and graduated from Jefferson Medical College in 1909, with a specialty in internal medicine. While visiting in Washington DC, he met the chief surgeon of the American Red Cross hospital in Kiev, Russia. Learning of the need for doctors in the ongoing conflict in Russia and seeing an opportunity to enhance his surgical skills, he left for the Russian front. He worked with the Siberian Division from 1915 to 1917, first as a civilian and later as a Russian captain. Once commissioned as a captain, he joined



**Lieutenant Colonel  
Malcolm C. Grow**

an army corps at the front line and learned firsthand the horrors of trench warfare. He was wounded and suffered from shell shock. He was decorated with the soldier's Cross of St George, an almost unheard of honor for a foreigner and rare even for a Russian. During the winter of 1915-1916, he recorded his war and flying experiences in the book *Surgeon Grow: An American in the Russian Fighting*. Many of his ideas about helping the common soldier and later the airman, were shaped on the Russian Front in World War I. After returning to the United States, he joined the 45<sup>th</sup> Artillery, Coast Artillery Corps, as a captain and surgeon and went to France in 1918. After returning to the States, he remained a surgeon in the US Army. After several attempts to enroll in the School of Aviation Medicine at Brooks Field, Texas, he was accepted in 1928. From that point, he was identified with research and developmental problems of aviation medicine and technology. He flew with test pilots in the 1930s and worked on various scientific projects, including studies to determine the maximum amounts of carbon monoxide allowable in the cockpit. His findings, the first of their kind, were published in an aviation book, *Fit to Fly: A Medical Handbook for Flyers*.

Although the Air Force became a separate service in 1947, it wasn't until 1949 that the Air Force had its own medical program. Grow became the first Surgeon General of the Air Force, a position he held for only 5 months, retiring in November 1949 after 31 years of service.

After his retirement, he remained a force in military medicine. For several years he retained a desk in the Office of the Air Force Surgeon General and acted as a consultant to his successor. In 1955, he provided technical assistance for the movie "On the Threshold of Space," dealing with aeromedics, a new term linking the study of air and medicine as essential elements for future space travel. Grow died 20 October 1960.

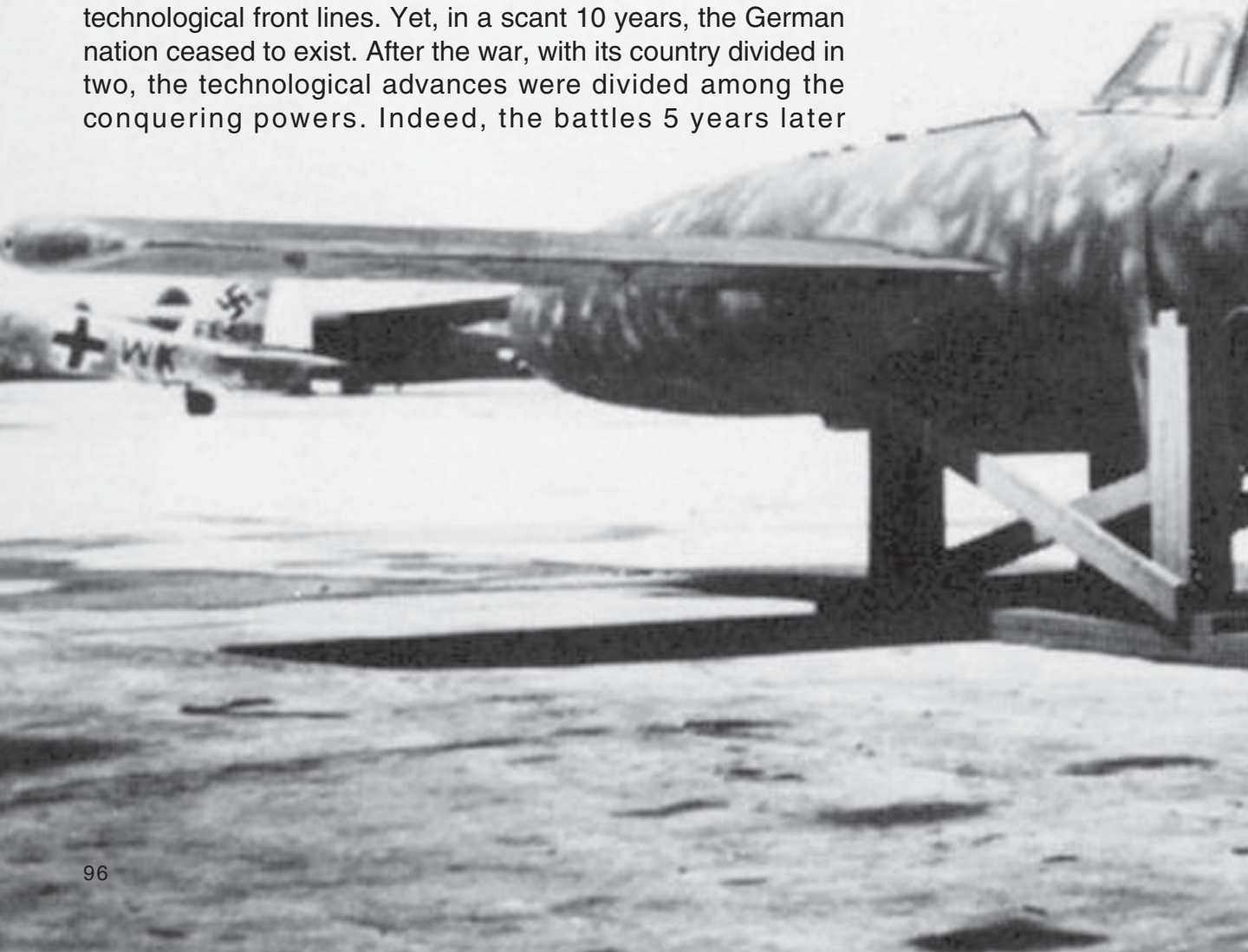
[Online] Available: <http://www.af.mil/bios/bio.asp?bioID=5643>; <http://www.alexanderpalace.org/thompson/76grow.html>; and [http://www.mgmc.af.mil/3rd/MedCenter\\_History.htm](http://www.mgmc.af.mil/3rd/MedCenter_History.htm).

# The Erosion and Implosion of German Technology During WWII

Major Charles A. Pryor III, USAF

## In the Beginning

**A**t the outset of the German buildup for World War II, the Germans were, arguably, the most technologically advanced nation in the world. Despite the limitations of the Treaty of Versailles, they secretly designed and built some of the most advanced aircraft in the world. From research into all metal aircraft, such as the Junkers Ju 52,<sup>1</sup> to the Messerschmitt Me 262, the world's first jet fighter,<sup>2</sup> the Germans were on the technological front lines. Yet, in a scant 10 years, the German nation ceased to exist. After the war, with its country divided in two, the technological advances were divided among the conquering powers. Indeed, the battles 5 years later





# FROM FIRST TO "WURST"



## From First to “Wurst”: The Erosion and Implosion of German Technology During WWII



*The German management system, especially in terms of the technological industry, was a complex and convoluted bureaucratic nightmare.*

between the Mikoyan-Gurevich MiG 15 and the F-86 were more among German engineers than among the nations actually at war.<sup>3</sup> The reasons for the implosion of the German state are manifold, two of which are addressed herein.

From a technological standpoint, many of the German designs and innovations remain valid. They were the true innovators of some of the world's current aircraft. Indeed, the Germans pioneered the use of wind tunnels, jet aircraft, pusher propellers, metal aircraft, and rockets in an attempt to overwhelm their Allied adversaries. Under the guise of Operation Paperclip, many German scientists and engineers were brought to America to work their magic on the American industry. Despite all this talent and its potential, few of the German designs were actually used during the war. Although their relevance is unquestioned, especially in view of current American (and worldwide) aircraft, they were untapped by the German leadership.

The German management system, especially in terms of the technological industry, was a complex and convoluted bureaucratic nightmare. Their system of committees and rings, coupled with a lack of centralized control at the top, served to undermine an economy that was resource-poor, in terms of both monetary and natural resources. This mismanagement, exacerbated by the effects of the Combined Bomber Offensive, transformed the German industry from one of the best to one of the worst, a system ready to implode had it not been helped on by the Allies. Further compounding the situation was the influence of Adolf Hitler. A man with a continental worldview and a penchant for doing things his way, Hitler was more of a hindrance to industry than a help. His constantly changing requirements led to costly and lengthy delays to the production of many aircraft. His inability to look beyond continental Europe from a practical standpoint ensured the German state never had a practical long-range bomber until it was too late. Indeed, the Germans ended the war with the same fighter and bomber with which they began the war, with only minor modifications and a dwindling ability to mass-produce them.

Many of the lessons from the German experience with technology and management are applicable today to the US Air Force. Without a doubt, today, the United States is the technological superpower of the world, yet it is plagued by many of the same problems that the Germans faced. Many of America's technological advances seem to be done for the sake of technology, rather than for an operational military need. Indeed, many of the needs of the American military may be met, in the short term, with existing technology or modifications thereto, rather than new programs. The true transformation of the American military and its technology will be a departure from the stovepipes of military acquisition, in which each service acquires its own (often redundant) systems, to a process of standardization among the equipment used to meet each service's needs. Furthermore, American military management is becoming as complex as that of the Germans. True, Americans have much more to worry about

than the Germans; for example the whole, poorly understood realm of space. The United States tends to solve its lack of understanding with additional bureaucracy, which exacerbates the overall situation. Alignment under a specific, overarching unified command could eliminate some of the waste and ensure an interoperable, standardized force for the future. Indeed, if the Department of Defense (DoD) does not learn and heed the lessons of the past, it is doomed to repeat them.

This article examines the efforts and impacts of German technology, both during World War II and today. Furthermore, it examines the impact and folly of German management of the technological industry and that industry’s subsequent implosion. Finally, this work draws some parallels between the World War II German system and the current American system, fully recognizing the difference between the totalitarian German state and the democratic American state. Despite the glaring and obvious difference between the two, there are similarities that could have a negative impact on America’s ability to wage war.

**Technical Marvels**

At the outset of World War II, the Luftwaffe was, undoubtedly, the world’s supreme air force. It had the most advanced fighter and bomber aircraft and the best trained crews. Despite this, the Luftwaffe suffered severe losses during the course of the war, including the loss of air superiority over continental Europe, which led to the downfall of the Third Reich. Its loss can be attributed to several factors, not the least of which was its inability to take advantage of, or maintain, the technological superiority enjoyed at the outset of hostilities. The technological superiority was not limited to aircraft fielded during the war but includes some interesting technical innovations that arose during the war but not fielded by the Luftwaffe. Many of these technical innovations are just now being exploited to their fullest potential. Indeed, many of the technological innovations taken for granted today were first developed in the factories and design laboratories of Messerschmitt, Heinkel, Arado, Focke-Wulf, Henschel, and Junkers. These companies—and the designers for whom they are named—were at the forefront of technical innovation during not only their time but also current times. Many of their innovations, such as canards, boundary layer control, sweptwings, variable wings, jet engines, and more are widely used today and accepted as industry standards. By examining Luftwaffe technological innovations, we can see a clear inspiration and technological marvel that transcends the aircraft industry today and whose impact is just being realized.

**Wind Tunnels**

One of the most enduring innovations of the Luftwaffe was its pioneering work with wind tunnels.<sup>4</sup> These devices allow an aircraft, or representative model, to be tested under conditions closely simulating those encountered during flight. By using inexpensive scale models of the aircraft, the engineers were able to determine if their design could withstand the rigors

From First to “Wurst”: The Erosion and Implosion of German Technology During WWII

In the Beginning ..... 96

Technical Marvels ..... 99

Wind Tunnels ..... 99

The Wings of Man ..... 100

My Grandma Wants to Fly  
Jets ..... 102

The Eyes Have It ..... 103

Subsequent Aircraft  
Technologies ..... 105

Good Ideas, But... ..... 106

Management for Dummies ..... 107

Who’s in Charge? ..... 107

Quantity Versus Quality ..... 109

Strategizing ..... 110

Strategy Shift ..... 111

Allied Impact on German  
Strategy ..... 112

Summing Up ..... 113

Forward to the Future ..... 114

Transformations ..... 115



---

## From First to “Wurst”: The Erosion and Implosion of German Technology During WWII

*Although the wind tunnels continued to operate throughout the war, their later years’ usage was confined to refinement of the V1 and V2 rocket designs.*

of flight across the spectrum of the flight regime. By varying wind velocity, the German engineers were able to simulate high- and low-speed flight regimes. Similarly, by varying wind velocity, they could examine high and low angle-of-attack regimes. By combining the results of these two areas of study, they could determine the robustness and feasibility of the design in relative combat situations. The essential information that arose during these tests was the feasibility of the design, answering several fundamental questions: would the wings remain attached at high speed and high angle of attack; would the aircraft stall at low speed and high angle of attack; what are the impacts of adding externally mounted items to the aircraft; what would happen to the aircraft once an externally mounted device was dropped (would it become unstable, thus unflyable); and what are the impacts on the aircraft center of gravity? These are fundamental questions concerning the flight worthiness of the aircraft that could be ascertained without having to risk the loss of a prototype or pilot.

Additionally, wind tunnels allowed for the testing of new technologies to smooth the flow of air across the wing. The Germans tested boundary area fences, leading-edge flaps, and boundary layer control, all in an effort to affect the flow of air across the wing surface.<sup>5</sup> With the straight, perpendicular wing style of the day, these aerodynamic controls would ensure the flow of air across the top of the wing was as smooth as possible, thus making the airflow faster and generating more lift. This increase in lift would generate more maneuverability in fighters and more load capability in bombers and more range in both types of aircraft. They tested each of these on many of their experimental designs, but the results of this work only were beginning implementation at the end of the war.

Although the wind tunnels continued to operate throughout the war, their later years’ usage was confined to refinement of the V1 and V2 rocket designs. Their staffs were increased in numbers, although those numbers were not used for testing; rather, they were used to mass-produce both weapons. The wind tunnels did stop work during the war after Peenemunde was bombed during the Combined Bomber Offensive, but this was only a brief work stoppage. Once the wind tunnels were relocated to Kochel, they were operational again. Despite this extraordinary testing, the German leadership was determined, by 1944, to focus all efforts on the defense of the Reich. Thus, the tunnels were not utilized to their full potential. The efforts of the personnel assigned to the tunnels were focused solely on one weapon system, not toward testing new technologies or capabilities. This failure to take full advantage of their technological capabilities is a true failure of the German leadership.<sup>6</sup> Indeed, the Germans missed out on several opportunities to exploit fully the wind tunnels, especially in the area of wing design. In this case, the designs were robust and innovative but were not tested by the Germans. Many designs were not tested and developed until long after the war.

### The Wings of Man

To increase range and speed, one of the most enduring German technological innovations was the sweeping of wings. During the war, the

Germans experimented with a variety of wing sweeps and designs, many of which are prevalent today. Indeed, the most enduring innovation of the Luftwaffe engineers was the rear sweep to a wing, which was found on many of the experimental aircraft designed during the war period.<sup>7</sup> Again, with an eye toward speed and range, the rear sweptwing offers a unique way of increasing lift without increasing weight. By canting the wing aft, the actual lifting area of the wing increased because of the distance the air must flow over the wing. This is done without increasing the surface area of the wing and incurring the corresponding weight penalty, resulting in an aircraft that has greater speed, payload capacity, and range (although all three must be balanced).

The tradeoff with this, however, is limited low-speed maneuverability. The reason here is the specific area where lift is generated. As with all perpendicular and rear sweptwings, the actual lift is generated at the wingtips due to the directioning of the laminar (air) flow over the wings. With perpendicular wings, this lift is approximately abeam the center of gravity of the aircraft, allowing low-speed flight and relatively high angle of attack. With rear sweptwings, the lift is aft the center of gravity, making low-speed flight unstable, thus dangerous. Therefore, by sweeping the wings aft, they were able to gain speed, lift, payload, and range while trading off low-speed maneuverability. The question the German engineers faced then was how to keep these increases without sacrificing the low-speed regime. Their answer was twofold: increase power (without the weight penalty) and change the sweep of the wings in flight.

One of the earliest proposals, although the Germans never flew it, was a swivel wing. Designed by Blohm and Voss, the idea was to have a single wing that would rotate from perpendicular to canted, depending on mission flight parameters.<sup>8</sup> This aircraft then would be able to take advantage of the low-speed characteristics of a perpendicular wing as well as the high-speed characteristics of a canted wing (less drag, more lift). This concept, although viable, was not proven until the National Aeronautics and Space Administration flew an oblique wing on the Ames AD-1 research aircraft in 1979.<sup>9</sup> Another wing technological approach to overcome the low-speed and high-speed maneuverability tradeoff came through the use of variable sweptwings. Familiar today for application on the F-14 Tomcat, the variable sweep technology is designed to move both wings from a perpendicular configuration at low speed to a rear swept configuration at high speed for the aforementioned reasons. A similar variation yielded the experiments into a solid delta-wing configuration, which consisted of a swept leading edge with a perpendicular aft edge and solid material in between, which yielded some successes but not until long after the war ended.<sup>10</sup>

One of the technological innovations the Germans actually flew in prototype was forward sweptwings. In this instance, Junkers took a conventional wing and swept it forward instead of rear. Coupled with jet engines, this aircraft more than compensated for the low-speed maneuverability liability of rear sweptwing aircraft.<sup>11</sup> By sweeping the

## From First to “Wurst”: The Erosion and Implosion of German Technology During WWII

*Familiar today for application on the F-14 Tomcat, the variable sweep technology is designed to move both wings from a perpendicular configuration at low speed to a rear swept configuration at high speed for the aforementioned reasons.*

---

## From First to “Wurst”: The Erosion and Implosion of German Technology During WWII

*Galland argued for the Me 262 to be a pure fighter aircraft, but Hitler was interested in making it a fighter/bomber.*

wings forward, Junkers changed the lift characteristics of the wing. No longer was lift generated at the wingtips, but with forward sweptwings, lift was generated at the wing root, which was adjacent to the center of gravity. The drawback to this design was the directioning of the wingtip vortices. In rear sweptwing aircraft, the vortices generated by the wind movement across the wing (a spiraling whirlwind) is directed across the wing and behind the aircraft causing little effect to the handling. In the case of the Ju 287, these vortices were now directed along the wing toward the fuselage, making high-speed or high-angle-of-attack flight dangerous. During high speed or high angle of attack, the vortices would overcome the elasticity of the wing, causing the wing to twist off. This difficulty was not overcome until the American X-29 program in the 1980s. Although not currently used, forward sweptwing technology provides a short-term capability, one that is already proven.

All these experiments into increasing speed, range, lift, and payload were never incorporated into the German production. Many were exploited after the war, however, and remain in use today. Facing an ever-expanding war situation, Hitler issued a series of Fuehrer directives in September 1941 that curtailed work on nonessential projects.<sup>12</sup> Hitler’s continental worldview was coming into direct conflict with his strategic expansions. By attacking Britain and later Russia, Hitler overtaxed his economic capability to conduct a strategic two-front war.<sup>13</sup> His economic focus switched to producing existing technologies en masse to stem the staggering losses of his overreach. In essence, he sacrificed quality and innovation for quantity.<sup>14</sup> This is prevalent throughout the Germans’ technological innovations.

### My Grandma Wants to Fly Jets

The second technique available to the Germans for increasing the lift, speed, payload, and range of its aircraft was to couple the rear sweptwings with jet engines. These engines were able to generate much more power than their propeller counterparts and could run on alternate fuels.<sup>15</sup> Although Messerschmitt was the first company to produce a jet aircraft, the first to design and test-fly one was Heinkel.<sup>16</sup> Heinkel actually began his research with the experimental He 178 by coupling jet engines with a perpendicular wing as a planned proposal for a two-engine fighter contract. This never panned out for Heinkel,<sup>17</sup> but Messerschmitt was able to couple the jets with a rear sweptwing design that became the Me 262, the world’s first jet fighter. Alas, the Me 262 never entered full production, primarily because of an argument between Hitler and General Adolf Galland over its specific role. Galland argued for the Me 262 to be a pure fighter aircraft, but Hitler was interested in making it a fighter/bomber. This led to a redesign of the Me 262 from fighter to fighter/bomber and back to fighter toward the end of the war.<sup>18</sup> The Me 262 did see some action against Allied bombers, but this was very late in the war, and it did not have much impact on the outcome of the war. Although a successful design, the Me 262 was fraught with powerplant problems. The Jumo 004, the primary jet engine

of the time, had a service life of 4-5 hours before it had to be replaced, making the maintenance and logistics of this aircraft cumbersome.<sup>19</sup>

Messerschmitt and Heinkel were not the only ones to experiment with jet engines. Arado and Messerschmitt had an impact on the US Navy F7U-3 Cutlass of the Korean era.<sup>20</sup> The centrifugal jet engine developed by Focke-Wulf became the primary powerplant for the Yakovlev Yak 15, the first Soviet jet aircraft, used during the Korean war era.<sup>21</sup> Arado also had success with the Ar 234, the first high-altitude, jet-powered reconnaissance airplane.<sup>22</sup> This aircraft was the precursor to the SR-71 Blackbird and the U-2 Dragon Lady. Although these designs had impacts after World War II ended, only the Me 262 was produced in any appreciable quantity by the Germans, and this was late in the war, after the war had been lost.

### The Eyes Have It

In addition to out-of-the-box thinking on aircraft design, the Germans were also the first to field and operate an instrument system, both for their own airfields (a precursor to the current instrument landing system [ILS]) and for directing their planes to a target. The first was the Lorenz beam system for blind landing, which consisted of two transmitters located on opposite sides of the airstrip runway. Both transmitted in simplified Morse code, one solely dots, the other solely dashes. The spacing of the dots and dashes was such that, where beams overlapped, a continuous tone was heard.<sup>23</sup> By moving left and right until the continuous tone was heard, the pilot would be aligned directly on the airstrip center line. Thus, in conditions of restricted visibility, the pilots could find their airfield. The limitations of the system were many. It did not take into account crosswinds or turbulence.<sup>24</sup> However, as pilots became skilled in the operation of this system, they could compensate for these difficulties and keep the continuous tone.

The other disadvantage to this was the lack of altitude information. The beams would guide a pilot to the airstrip, but in conditions of zero visibility, they did not provide altitude. This can be overcome by the directioning ability of the transmitters. Essentially, the overlap portion of the beams (the area with the continuous tone) was conical. As the pilot flew toward the airfield, the cone narrowed toward the centerline. Thus, the absence of a tone could indicate the pilot was too high, and he could compensate accordingly. All in all, it is a risky system, but it is better than nothing. Without this, the pilots would have to divert to another airstrip, one not weathered in, which further added to the distance they needed to fly. This became a significant factor during the Battle of Britain when the German fighter escorts were flying at their maximum radii. Any additional flight time or distance could prove disastrous.

The offensive adaptation of the Lorenz system was known as the *Knickebein* system. Designed to be a long-distance target designator for use during night bombing, the *Knickebein* system consisted of two Lorenz transmitters, one that looked at the target along the ingress line, the other at the target from the profile. The pilots, using the Lorenz system in reverse,

*The other disadvantage to this was the lack of altitude information.*

---

## From First to “Wurst”: The Erosion and Implosion of German Technology During WWII

*Radio frequencies operated over long distances are easy to disrupt once the transmit and receive frequencies are known.*

would fly away from the first transmitter while maintaining the steady tone in their headphones. Once they were in range of the target, they would switch to the frequency of the second transmitter, while occasionally checking with the first transmitter to ensure they were still on the proper vector. When the second transmitter gave them a steady tone, they were directly over the target and could release.<sup>25</sup> A subsequent refinement of this system, known as the *X-Geraet*, followed the same logic as the Knickebein system, with some refinements. Instead of using the beam intersection to mark their target, the pilots would fly the original beam toward the target. The second transmitter was actually a collection of transmitters, each of which would broadcast on a particular vector. Where each beam of the second transmitter intersected the first beam, the pilots had to hack a certain distance from the target. The *X-Geraet* pilots then would drop flares to literally light the way for the planes that followed.<sup>26</sup>

A further refinement of this technique was the *Y-Geraet* system, receiver and transmitter combination, where the aircraft will fly a designated vector and periodically retransmit a signal from the ground transmitter. A ground receiver would pick up the retransmitted signal. By calculating the phase shift, the difference in time between the transmitted and received signals, ground controllers had a picture of whether or not the pilot was on vector and could correct their pilots accordingly.<sup>27</sup> This type of ground control (although not the *Y-Geraet* style system) is used today by the ground tactical air control squadrons.

The advantages of these systems, despite their drawbacks, are obvious from the German point of view. They had the ability to direct and control their aircraft as well as recover them in less than optimal conditions. These systems also facilitated night bombing, which adds a psychological effect to the physical effect and destruction. From the British point of view, these systems were of import as they were easy to overcome. Radio frequencies operated over long distances are easy to disrupt once the transmit and receive frequencies are known. The Germans kept their systems simple, using dots and dashes on prescribed frequencies, but the British overcame this by inspecting aircraft that had been shot down. The British did not need to know what to listen for once they had the frequency. Using a technique known as meaconing, whereby the British flooded the various German frequencies with extra traffic, the British were able to defeat the Knickebein and *X-Geraet* systems.<sup>28</sup> To overcome the *Y-Geraet* systems, the British merely jammed the frequency.<sup>29</sup> Despite their limited operational life, these systems were the predecessors to the current ILS and radar systems, both of which allowed for night bombing. As the Combined Bomber Offensive demonstrated later in the war, the Allies were able to keep pressure on the German homeland through daylight bombing by American planes and night bombing by British planes. Without radar and ILS, these night bombings would not be possible, providing the Germans with time to reconstitute or continue production without feeling the effects of bombing.



---

## Subsequent Aircraft Technologies

Faced with the challenge of designing aircraft that could outperform their enemies, the German engineers looked at ways to improve the speed, maneuverability, and altitude of its fighter force. The root reason for this work was the theory that to defeat the Allied bomber streams they would have to attack them at their weakest point, which was from above. Thus, they needed aircraft that could fly at extreme altitudes. In addition to their work on jet engines, the Germans looked at ways to improve propeller-driven aircraft. One of the technical solutions to this problem was fielded in their fighter force. They replaced the old radial air-cooled and liquid-cooled engines with a high-compression piston engine. Essentially a sealed, self-contained engine that was not dependent on a bladder of coolant, this engine allowed fighters to perform negative *g* or inverted maneuvers.<sup>30</sup> This gave them a significant maneuvering advantage when engaging enemy formations. Additionally, this engine would increase the performance envelope of the bomber fleet, allowing them to fly farther than they could with the radial engines. Alas, the performance increase in bombers was not enough to have a significant impact on the war, but the impact of the souped-up fighters was felt. The Allies were able to counter this added threat; however, the Germans succeeded, at least initially, in almost equaling the score with their fighters. Additionally, by examining defeated aircraft, the Allies were able to capitalize on German technological advantages.

Another engine modification fielded by the Germans in limited numbers was a relocation of the engine and propeller. Some of the German aircraft that flew as prototypes had pusher-type propellers. Located at the rear of the fuselage, these pusher propellers were more efficient in terms of fuel usage than traditional puller propellers. The Germans were never able to capitalize much on pusher-propeller aircraft during the war because of their management practices, but the pusher propeller is in use today on long-duration aircraft such as the Predator. Although these were significant technological innovations, ones that have endured and are still in use today, the Germans were unable to capitalize on them because of their failure to properly implement modernization and upgrade their aircraft fleet. As indicated earlier, the German industrial capability was stressed to maintain production of existing aircraft to counter the Allied mass of aircraft. This left nothing for development of new technology.

The interwar years saw the rise of Lufthansa as a commercial airline of the Weimar republic. Headed ostensibly by Hugo Junkers, the main workhorse of the Lufthansa commercial fleet was the Ju 52, an all-metal commercial airliner. The Ju 52, pressed into service during the war as both a cargo aircraft (people and materiel) and a limited bomber, had the capability to carry more items than the previous wood and canvas aircraft. To offset the additional weight, Junkers put on a third engine. This venerable aircraft saw service throughout the war, although primarily as a cargo and troop carrier, eclipsed in the bomber role by the He 111 and

## From First to “Wurst”: The Erosion and Implosion of German Technology During WWII

*The Germans were never able to capitalize much on pusher-propeller aircraft during the war because of their management practices.*

---

## From First to “Wurst”: The Erosion and Implosion of German Technology During WWII

*The German aircraft industry was populated with some of the premier engineers and designers of the time who were able to come up with some truly revolutionary ideas for designing and building aircraft.*

Ju 88. Nevertheless, most aircraft built during the war were made of metal, thus more robust and survivable than the previous wood and canvas design. The use of metal aircraft also allowed German engineers to examine the possibility of pressurized cabins.<sup>31</sup> During the war, pilots who flew above a certain altitude were required to use oxygen to counteract the effects of altitude. As an aircraft rises in altitude, the oxygen concentration in the ambient air lessens. If an aircraft flies high enough, it can lead to oxygen deprivation, causing the pilot and crew to black out. With the advent of pressurized cabins, the aircraft would be able to fly higher without the requisite oxygen aboard. By pressurizing the cabins, the ambient air within the cabin maintains the same oxygen concentration as it would sitting on the ground, negating altitude sickness and oxygen deprivation. Although the Germans never fielded this, it is in wide use in all aircraft applications today.

### Good Ideas, But...

Throughout World War II, the Luftwaffe sought to maintain its technological superiority over the Allied forces. They sought to do this by designing capabilities into their aircraft that would allow them to fly higher and faster than the Allied aircraft.<sup>32</sup> This led to an “explosion of new project activity unequalled in the history of aviation, an explosion that was fueled even further in 1944 by the lifting of all patent protection.”<sup>33</sup> The German aircraft industry was populated with some of the premier engineers and designers of the time who were able to come up with some truly revolutionary ideas for designing and building aircraft. The Germans were the first to design and use jet engine aircraft, metal aircraft, instrument navigation, sweptwing technology, and advanced testing through wind tunnels. Some of their more radical designs, such as the Gotha flying wing concept,<sup>34</sup> would not be realized until many years after World War II. Indeed, many of their innovations were quickly picked up by the Allied forces. Bower astutely notes:

Since 1945, the genesis of weapons by all four Allies has been dominated by the inheritance of Germany’s wartime inventions. Indeed, the Korean War can be viewed, on the technical level, as a trial of strength between two different teams of Germans: those hired by America and those hired by the Soviet Union. The aerial dogfights between the Soviet MiG-15 and the American F-86 Sabres—both designed by German engineers—dispelled for many their doubts about the expediency of plundering Germany’s scientific expertise.<sup>35</sup>

Thus, the Germans did not lack grand and effective technological innovation. Yet, they were resoundingly unable to take advantage of this situation and were completely unable to bring these revolutionary concepts into operation. The reasons for this are manifold, but the centermost reason for their inability to exploit their technological superiority lay with the complex, convoluted, and inefficient management system in place in Germany during World War II.

---

## Management for Dummies

One of the most overlooked practices in the business of technological innovation is the impact of management on the overall process. Management of technology is crucial to the successful implementation of revolutionary ideas and processes. Management needs to be not only knowledgeable of the designs and ideas of the engineers but also receptive to them. Management needs to provide a roadmap to what is to be accomplished. Without clear-cut direction, meaning a vision and goal not micromanagement, any technological advance is doomed to irrelevance. An overall strategy will provide the engineers with the proper vector to direct their abilities and ideas. Furthermore, management needs to provide clear and unambivalent boundaries to the efforts of the engineers to ensure the technological innovations and ideas stay focused and attainable. Finally, the management structure needs to be streamlined and simple to allow ideas to flow not only laterally but also vertically. Binding management to a complex and suffocating bureaucracy will have the same effect on the industry as a whole.

Alas, the Luftwaffe found itself in just such a predicament during the war. It had a complicated and convoluted approval process for the technological advances forwarded, one that was wasteful of not only resources but also time. It had little strategic direction and no boundaries on the effort to advance technology. It also had the wrong people in charge of the various agencies that headed up, collectively, the overall effort. The result was a host of revolutionary innovations that would have all but guaranteed they remained technologically superior but were doomed to be merely paper tigers by the bulging management process and poor leadership. These paper tigers were exploited by the Allied powers after the war, but the Luftwaffe was unable to take advantage of them. The overall operational result was an air force that ended the war with the same equipment with which it began, quality equipment at the start but obsolete in 1945 when compared with the equipment of the Allies.

## Who's in Charge?

At the core of the management of Luftwaffe technology was Hermann Goering. As Hitler's duly appointed head of the Luftwaffe, he was responsible for ensuring the Luftwaffe had the necessary tools to prosecute the war. The Luftwaffe was responsible for determining its own requirements to ensure it could fight. Similarly, the navy and army each had that responsibility. While this is to be expected, what was lacking in Germany overall (and the Luftwaffe, in particular) was centralized control. There was no one agency in charge of military procurement. Indeed, "production was pitifully small. The fault lies clearly with the Technical Office whose lack of initiative cannot be ignored and with the Luftwaffe General Staff...which failed completely to provide the guidance expected of it."<sup>36</sup> Thus, there was no direction, no vectoring of the effort to ensure the proper item was developed. In other words, there was no one in charge.

## From First to "Wurst": The Erosion and Implosion of German Technology During WWII

*These paper tigers were exploited by the Allied powers after the war, but the Luftwaffe was unable to take advantage of them.*

---

## From First to “Wurst”: The Erosion and Implosion of German Technology During WWII

*Early German industrial organizational structure was an attempt to maintain centralized control over industry as it attempted to shift to a wartime footing.*

Further complicating the effort was the process for placing something on contract. The Luftwaffe would award a production contract for an aircraft based solely on its design.<sup>37</sup> This essentially skips the research-and-development portion of modern-day acquisitions, with the Luftwaffe assuming the risk that the design will not work. In many cases, the prototypes developed did not meet expectations (or requirements).<sup>38</sup> Thus, large quantities of resources were spent and expended for something that did not work. This is an incredibly ineffective way to manage a contract. Further increasing the drag on the resources was the number of programmatic changes enacted. With the swift progress of the war and the swifter progress of implementing minor technological changes, the German factories and modernization centers were hard-pressed to keep up.<sup>39</sup>

Finally, to keep the costs from escalating beyond what was already wasted, the Germans enacted price fixing for the industry. Essentially, a contractor could choose one of three pay categories: one which they were not taxed (but had to be a low contract bid), one where they were taxed, and one where they were taxed and some of their costs recouped. The latter only could be chosen with approval from the government.<sup>40</sup> In essence, from a fiscal point of view, German management of the contract process was a shambles. Valuable resources were wasted by betting the design would work, and the designs were changed constantly, costing more resources and further straining an industry that was undermined by fixing prices to the advantage of the government. This poor fiscal policy was further convoluted by the complicated organizational structure of the German industry.

Early German industrial organizational structure was an attempt to maintain centralized control over industry as it attempted to shift to a wartime footing. In each of the industries of the Third Reich was one person at the head. Directly beneath the head was a main committee, made up of the industry leaders. Ostensibly, the function of this main committee was to evaluate the way each of the companies in the industry did business, select the best from each, and have all factories implement these best practices. Further refining this process, there were special committees under the main committees that dealt with specific parts of the whole. These special committees were also responsible for implementing best practices among their subordinate factories in an effort to increase standardization and efficiency and reduce cost.<sup>41</sup> In theory, this seems to be a sound business practice; however, management by committee (or in this case, by many committees) was not very practical. When combined with poor fiscal guidance and a lack of strategic direction, this system merely complicated the problem.

Furthermore, in 1940, a system of rings was introduced into the industry. These rings were essentially committees but not limited to one industry. These rings were concerned with items and issues that transcended all industry. For example, the ring concerned with the making of steel would have an impact on all committees who used steel (which

---

## From First to “Wurst”: The Erosion and Implosion of German Technology During WWII

was all of them). The system that finally evolved consisted of “4 main rings for subcontracting and 8 main committees for the finished product.”<sup>42</sup> Each of these committees and rings had subcommittees and subrings to them, further increasing the bulging bureaucracy. Known as Self-Government of Industry, this system could be effective in the hands of a skilled manager like Albert Speer. The armament industry under Speer became more efficient and productive<sup>43</sup> despite the complicated system. However, under managers like Karl-Otto Saur, the opposite happened. Indeed, as Goering stated:

Saur was a man completely sold on figures. All he wanted was a pat on the shoulder when he managed to increase the number of aircraft from 2,000 to 2,500. Then the Luftwaffe was blamed that we had received so and so many aircraft and where were they.<sup>44</sup>

Unfortunately, for the Luftwaffe, this thinking tended to dominate the war-production effort. The result was a gross number of aircraft (quantity), many of which were unusable or obsolete (quality).

### Quantity Versus Quality

One of the toughest challenges faced by management in a technological industry is the issue of quantity versus quality. Both are important and must be effectively blended to have a successful program. Unfortunately, for a country whose industry was poorly managed and resource-constrained and faced with an enemy with a seemingly endless supply of high-quality equipment, the natural tendency to fight mass with mass (matching quantities) overrode the necessity to instill some quality in the airplanes produced.<sup>45</sup> The result was a large number of inferior aircraft that could not have kept pace with the Allies, even if they were numerically similar. In mortal combat, quality is often the divide between success and failure. This was proven by the Tuskegee Airmen flying bomber escort from Italy. Although the number of P-51s sent to escort a bomber formation did not change drastically, they still escorted more than 200 missions without a single bomber loss. This is attributed to both the skill of these pilots and the quality instilled in the machines they flew. Alas, the Germans did not have the quality in their aircraft to overcome this.

By war's end, the Germans had lost the technological superiority they owned at the beginning. Although this can be directly attributed to their management system, this issue was further exacerbated by their failure to integrate the capabilities of the captured lands effectively. Indeed, rather than capitalizing on the capabilities of the workers in the conquered lands, the Germans merely plundered them and brought their populations into slave labor.<sup>46</sup> They failed to realize and take advantage of what was available to them. The result was a slave workforce that resented its masters. Needless to say, this was another cause of their diminished quality. Finally, as the war progressed, the Germans began conscripting just about any male with a pulse, regardless of his civilian expertise. This led to a lack of skilled workers, without whom quality suffered.<sup>47</sup> This is almost a

*By war's end, the Germans had lost the technological superiority they owned at the beginning.*



---

## From First to “Wurst”: The Erosion and Implosion of German Technology During WWII

*Without a sound and appropriate strategy or roadmap, anything attempted has the distinct probability of failure.*

double tap for quantity over quality—specifically, make the armed forces larger to counter the large force regardless of special (or needed) skills, depriving industry of the skilled workers necessary to instill quality in products sent to the armed forces.

However, equipment was not the only area in which quality suffered. As the war progressed, training for pilots was cut almost in half, primarily because of the need to have replacements for pilots lost in combat. The result was pilots significantly less skilled than earlier groups that entered combat. Poorly trained pilots, flying inferior equipment against a determined enemy on two fronts, is a sure recipe to create an even greater need for replacement pilots. In short, the German economy and industry could not keep up with the demands of a two-front, widely flung war and elected the desperation strategy of throwing everything it had into the fray, regardless of training or expertise. The result is obvious.

Although the complicated nature of industry organization is certainly a contributing factor to the inability of the Germans to exact victory, the lack of management and leadership from the top down definitely compounded the problem exponentially. Without a sound and appropriate strategy or roadmap, anything attempted has the distinct probability of failure. From the beginning, the German strategy focused on Europe and a blitzkrieg style of warfare. As Hitler’s aspirations grew (and the war with them), the overall German strategy failed to take these new ideas into account.

### Strategizing

From the beginning, the Nazi party rose to power in Germany under the guise of nationalism. Many Germans were still upset over the limitations imposed by the Treaty of Versailles at the end of World War I, in particular the clause that laid the blame for World War I and the resultant carnage squarely on the Germans. Additionally, the German people were adamant about reclaiming the land annexed away from them by the Treaty of Versailles. Undoubtedly, there were also some bad feelings about the French, who were seen as most responsible for the War Guilt clause. Thus, there were some strong feelings of being unfairly and cruelly treated in the aftermath of World War I. This was exacerbated further by the inability of the Weimar Republic to fill the void effectively left by the abdication of the Kaiser. The general disgruntlement of the German people led to a fierce feeling of nationalism and a desire to put someone into power who could actually do something about their situation.

Enter Adolf Hitler, a recognized and decorated World War I veteran who had the charisma and rhetoric to rouse the population. Simply put, he knew what to say and had a forceful enough presence to ensure the people believed him. After his election to chancellor and the death of President Paul von Hindenburg, Hitler combined the two offices into that of Fuehrer and began to attempt to make good on his nationalism pledges. Realizing one of the reasons for the German defeat in World War I was the failure to generate the economy to a war footing, the Third Reich began

---

## From First to “Wurst”: The Erosion and Implosion of German Technology During WWII

increasing its economic capability.<sup>48</sup> Ostensibly, this was to continue the nationalistic regaining of indigenous German lands unfairly removed from them. This included the German pushes into Austria; the Sudetenland; Czechoslovakia; and ultimately, Poland. This desire to increase their *lebensraum*, or living space, was risky, however. At any point, the Allied powers (then Britain and France) could respond.

Hitler was emboldened during the operations prior to Poland by the lack of Allied response to his offensives. He assumed they would continue their policy of appeasement after the Poland campaign, especially after he signed a nonaggression treaty with the Soviet Union. Alas, Allied appeasement ended with the invasion of Poland, and both Britain and France declared war on Germany. Hitler was ready for this, however, and ordered his troops into France, occupying, in short order, about two-thirds of France.

From here, things began to go south for the Reich, despite their strong army and technological superiority. Up to this point, every campaign engaged in by the Germans had been a blitzkrieg-style campaign:<sup>49</sup> hit the enemy hard and fast to overcome their defenses and then bring them into the Fatherland. As such, the German economy was geared to this type battle. There was reconstitution time between the battles, giving the economy and industry time to recoup the losses. Germany's continental focus was driving its blitzkrieg strategy, and its economy was geared to this. Thus, it produced high-quality, short- and medium-range fighters and bombers in large quantities to accommodate the blitzkrieg of the enemy. Since many of the battles took place within easy distance of Germany, there was no need to delay the production of aircraft to build and stock spare parts; they would just make another airplane to replace the damaged or destroyed ones.<sup>50</sup> While this worked well at the outset of the war, its significance grew as the German battlespace expanded greatly. Compounding this, pilot training was limited to tactical training only,<sup>51</sup> as there was no need to think beyond this level. Yet, with the onset of the Battle of Britain, the Germans changed strategy, whether or not they realized it.

### Strategy Shift

World War II might have ended differently had Hitler elected to maintain his *lebensraum* policy and restrict his actions to continental Europe. Nevertheless, he attacked Britain, ostensibly to ensure the British stayed out of the war. From a tactical point of view, this was a huge mistake. To attack London, his fighters (upon whom the bombers relied for protection) had to operate at the limits of their range if they were to successfully return to France. In other words, he was now fighting a strategic war with a tactical force. Hitler had arbitrarily escalated things, a precursor of things to come.

As the war progressed, Hitler would return time and again to the concept of changing things to fit his worldview *du jour*, with no apparent thought to the impact on either society or industry. The most glaring example of his inconsistency concerns the Me 262, the world's first jet fighter.

*World War II might have ended differently had Hitler elected to maintain his lebensraum policy and restrict his actions to continental Europe.*

---

## From First to “Wurst”: The Erosion and Implosion of German Technology During WWII

*The German leadership severely underestimated the Allies’ drive and dedication while simultaneously overestimating their own ability*

Originally designed as a fighter, Hitler ordered it changed to a fighter/bomber against the advice of Erhard Milch and Galland. The resultant delay to retrofit the Me 262 to a fighter/bomber ensured that, when it was ready for use as a bomber, the need was for fighters to defend the dwindling Reich. The Me 262, again at Hitler’s insistence, was re-retrofitted back to a fighter, another delay to the program that ensured it was not introduced into the war until early 1945.<sup>52</sup> The argument over the Me 262, in which Goering sided with Milch and Galland, marked the beginning of the end of Goering’s favor with Hitler. The result was a complete lack of Luftwaffe representation at future meetings.<sup>53</sup>

After the loss in the Battle of Britain, Germany took a pause to recoup its losses; then Hitler made another large strategic mistake—he attacked the Soviet Union. Once again, he escalated the war effort to strategic levels with only a tactical industry and military. The results were disastrous for the Reich. They severely overextended themselves on the Eastern Front, which ensured their already fragile logistics support was stretched too thin. Additionally, the demands on industry for a two-front war were too hard to bear. In short, production could not keep up with losses, and there was almost no way to resupply the troops because of a lack of transport aircraft.<sup>54</sup> Finally, the German leadership severely underestimated the Allies’ drive and dedication while simultaneously overestimating their own ability.<sup>55</sup> This ill-equipped armed force with little reconstitution ability, fighting a war that was larger than it was prepared for or capable of, with no clear written strategy and numerous changes to the direction of the effort, would have ensured the Reich imploded. However, the Allies were not content to take the time to allow this to happen. They decided to help it on its way through the Combined Bomber Offensive.

### Allied Impact on German Strategy

The Combined Bomber Offensive was a massive push by American and British air forces to provide continuous day and night bombardment of the German homeland, focusing on its industrial capabilities. The American forces were responsible for the daylight bombing, the British for nighttime bombing. The Combined Bomber Offensive almost stopped before it started, primarily because of a lack of fighter escorts for daylight raids. The massive formations of B-17 aircraft were susceptible to the German fighter aircraft, and the resulting losses almost ended this aspect of the offensive. This changed with the introduction of the P-51, a highly maneuverable and capable fighter with range to escort the bombers all the way to their targets. These fighter escorts also served a second function, that of *attriting* the German fighter force—essentially a trench-style slugfest in the air. It was extremely successful in this second role, removing German air superiority over continental Europe and ensuring Allied planes could roam the European Continent with relative impunity.

The effects on the German industry are even more telling. In addition to other targets, the Allied offensive destroyed the German transportation network, severely limiting its ability to operate a dispersed industry.

---

## From First to “Wurst”: The Erosion and Implosion of German Technology During WWII

Furthermore, the Allies concentrated their efforts on the critical Ruhr valley, which was the location of German stocks of coal.<sup>56</sup> The coal was used as a power-producing source and critical to the German war industry. The effects of these raids were felt throughout German society and industry as it placed severe hardship on its already overstressed and limited supply of raw materials and transportation. Compounding the German situation, the Allies struck many of its fuel sources. Indeed, in the after-war interrogations, Goering admitted that fuel was a significant limiting factor to production, especially in the production of a four-engine bomber. In discussing the He 177, Goering said, “I had to ground that aircraft because it consumed too much gasoline, and we just didn’t have enough for it.”<sup>57</sup> Finally, the Allied attacks had a significant impact on the German industry’s depots and production facilities.<sup>58</sup> The Combined Bomber Offensive was more than a combination of American and British bombing techniques. It combined with the Germans’ inefficient and poorly managed industry to finally break the back of the German war machine.

### Summing Up

Throughout the war, the German state was unable to take advantage of many of its indigenous capabilities. Beginning with decentralized control of their procurement process and abetted by a complicated and wasteful fiscal policy, the industry simply could not keep up with the demands of the war. Furthermore, its organizational structure was not conducive to change. Its system of committees and rings with all the subcomponents thereof was an attempt to increase efficiency and reduce cost through standardization of production practices. It actually did not happen that way, as it was a system that could not grow to fit the increased need. The Germans effectively proved that management by committee does not work in a wartime situation. Compounding this further were the people they placed in charge. With a few notable exceptions, the men selected to run the industry were party lackeys who had limited experience and know-how when it came to running an industry.

Strategic direction from the state leadership was completely lacking. What began as a continental campaign to reverse the perceived unfairness of the Treaty of Versailles rapidly expanded into a global strategic battle for world dominance, all with an economy that was geared toward a blitzkrieg-style tactical engagement. German industry was never able to recover from this continental focus, dooming the strategic efforts to failure. Furthermore, the personal and direct involvement of Hitler into all aspects of the war effort only served to confuse and befuddle the national leaders. In other words, absolutely no direction was provided to guide the war effort. This led to numerous production delays as aircraft were constantly fitted and refitted to meet the ever-changing requirements. Additionally, the German leadership had two key misconceptions that may have attributed to their constant change. First, they underestimated the Allies, and second, they overestimated themselves. The added impact of the Combined Bomber Offensive served to exacerbate an already deteriorating situation and helped ensure the 1,000-year Reich lasted a mere 12 years.

*The personal and direct involvement of Hitler into all aspects of the war effort only served to confuse and befuddle the national leaders.*

---

## From First to “Wurst”: The Erosion and Implosion of German Technology During WWII

*The Germans felt a sense of outrage and frustration at not only the loss of land but also the humiliation that accompanied the Treaty of Versailles.*

## Forward to the Future

As the US Air Force begins its fourth major transformation in 11 years, there are some striking similarities between what it currently faces and those challenges faced by World War II Germany. Notable among them is a strong sense of nationalism. No one can doubt the surge in American patriotism since the 11 September 2001 events, and one cannot overlook the sense of outrage and frustration at the horrific waste of human life and American potential. Yet, a parallel can be drawn between this and the general feelings of the average German during the interwar period. The Germans felt a sense of outrage and frustration at not only the loss of land but also the humiliation that accompanied the Treaty of Versailles. In hindsight, these feelings perhaps are justified, but the results for Germany were disastrous. Fortunately, the American people are not following the same political trend, nor could we, given our process for electing our officials and the constraints and restraints placed upon them.

Currently, there is no real centralized control over the American Armed Forces acquisition program. As it was for the Germans in 1935, the American Armed Forces currently follow separate stovepipes for acquisition of weapon systems. There are separate DoD programs for ballistic missile defense among the Army, Navy, and Air Force, as well as different programs for acquisition of unmanned aerial vehicles. The acquisition programs for the F-35 joint strike fighter follow the same path, each service pursuing its own agenda to meet its own needs. This was exactly the same at the beginning of the German buildup for World War II. Each service had its own unique requirements, and each pursued them independently of the other. The result was an egregious waste of valuable and limited resources, both natural resources and dollars. In essence, they ended up paying for essentially the same thing three times. It is the same today with the American military. We have separate programs for the X-45 Air Force unmanned combat aerial vehicle and the X-47 Navy unmanned combat aerial vehicle. Both are experimental, and both operate more or less independently of the other. The end result will be two unique systems that meet specific needs without addressing the overall interoperability between systems. While the Germans were not faced with each branch of the service creating its own flying machine, the overall competition between the Services for constrained resources and the inability of the leadership to differentiate, much less prioritize, among the service requirements led to incredible waste and effort.

Similarly, the US Air Force, today, faces much the same challenge as the Luftwaffe, specifically determination of mission and needs. As the Luftwaffe vacillated between a fighter and bomber, the same struggle goes on today in the US Air Force. With the cost of each individual unit escalating rapidly (because of the investment in technology), what is the priority, fighters or bombers, given that the United States really cannot afford both? Further complicating matters is the need to build tankers and lift aircraft. While the Luftwaffe merely ignored this, to their detriment,



---

this remains a central concern for Air Force officials. While not a concern for the Luftwaffe, the American conundrum is compounded by the oft-overlooked integration of space into the battlespace. The items placed in space are extremely expensive and difficult to make, yet, paradoxically, are always there to aid the warfighters. As long as these systems continue to perform, they will be overlooked largely by people who do not understand their mission or importance until it is too late. All these compete for limited resources, those doled out with a medicine dropper by a dubious legislative branch. This merely compounds the larger issue facing the Air Force today, that of identity.

## Transformations

Since 1992, the Air Force has undergone four major transformations. The Air Force has evolved from the Cold War hallmarks of Strategic Air Command, Military Airlift Command, Tactical Air Command, and Air Training Command to the current configuration of Air Combat Command, Air Mobility Command, Air Education and Training Command, Air Force Space Command, and Air Force Materiel Command. Designed to be functionally aligned, each command was changed to be a stand-alone force capable of operating within its own unique and nonoverlapping mission areas. The Air Force then transformed to the expeditionary air forces, an idea that creates ten stand-alone composite forces to handle regional situations worldwide. In essence, the expeditionary air forces are a combination of the functionally aligned major commands of today and the geographically aligned major commands of yesterday. Each air expeditionary force contains strategic and tactical elements yet draws from the respective major commands for expertise. Finally, the Air Force is transforming to a task-force-based concept, which is essentially a subset of the expeditionary air force designed to handle a specific contingency as it arises. All this combines to leave a large uncertainty about the mission and function of an air force.

When asked exactly what it is the Air Force does, the answer depends on when the question is asked or what is going on in the world. In other words, there is limited identity within the Air Force about its mission. This is exacerbated by the fact the corporate identity seems to change with each new Chief of Staff. As Goering's Luftwaffe provided little or no unique identity and mission to its members, so the Air Force faces the same dilemma. The result has been a restructuring of the Air Force from one that can fight an outmoded form of war to one that can survive in an outmoded form of peace. American worldview, like that of the German forces during World War II, has remained stagnant. While paying lipservice to a contingency-based, flexible, expeditionary force, the Air Force remains firmly locked in the planning and budgeting of a Cold War, two-major-theater-war mentality.

The one issue the Department of Defense has handled well is the creation of the unified commands. Each command is designed to be a warfighter or a functional command with expertise in either a particular

## From First to "Wurst": The Erosion and Implosion of German Technology During WWII

*While paying lipservice to a contingency-based, flexible, expeditionary force, the Air Force remains firmly locked in the planning and budgeting of a Cold War, two-major-theater war mentality.*

---

## From First to “Wurst”: The Erosion and Implosion of German Technology During WWII

*Many of the acquisition programs undertaken by the Air Force fail to consider the low technology or already existing technology approach, often at a large pricetag for a limited capability.*

area of responsibility or a particular function. There is no overlap in responsibility (except for the functional commands, which operate somewhat autonomously of the geographic commands), yet each of the unified commands manages to share resources and information without regard to which component provided it. In many ways, this mentality needs to transcend the programmatic stovepiping of each of the military branches.

The issue of technology is becoming the forefront of American procurement and acquisition issues. As the Germans did in 1935, America now enjoys a technological superiority over friend and foe alike. At the present, there is no match for American technological know-how and application. Yet, this technology is only as good as its application. As the Germans found out, developing technology just because you can is a poor reason to carry out a government program. While the Germans had some technological innovations, such as jet engines and wind tunnels, many of their technological advances were not realized until after the Reich had vanished. Indeed, developments such as the Gotha P.60 flying wing-style fighter were not adopted until recently with the advent of the B-2 Spirit. The German programs were mismanaged from above almost from the start, including no boundaries on where technology could go. The American problem is more geared to including technology into *simple* problems, simply because it is possible. Many of the acquisition programs undertaken by the Air Force fail to consider the *low technology* or already existing technology approach, often at a large pricetag for a limited capability.

Further complicating the picture is the management of our acquisition programs. In most cases, for a new system, it can take 10-20 years from identification of the problem to fielding a system to defeat or answer the problem. Often, the items fielded are obsolete before they enter production because of changing world needs. Granted, the Department of Defense has not fallen into the pitfall that awaited the Germans; namely, changing existing programs to meet evolving needs. However, the Department of Defense tends to create a new program to handle a problem, which significantly compounds the ability to field forces capable of responding in the manner in which they are needed. Each of these programs will compete for existing, limited funds, resulting in a compromise that answers neither the existing problem nor the original problem. Additionally, the acquisition process is bureaucratically robust. Very little can overcome the inertia of the albatross (the bureaucracy) surrounding acquisition programs, and nothing gets through quickly. The Department of Defense has so many layers of management to get through that it becomes almost a self-licking ice cream cone when faced with an immediate and unforeseen threat. In certain rare circumstances, this inertia can be overcome, but these are the exceptions rather than the rule.

Finally, the American worldview is stagnant. As the Germans could not see beyond continental Europe, so the Americans cannot see below the strategic layer. The Germans could not see the forest for the trees, and

---

## From First to “Wurst”: The Erosion and Implosion of German Technology During WWII

America cannot see the trees for the forest. America still believes, despite the 11 September attacks, that it cannot be touched by a foe. Americans believe the way to counter potential foes is to apply a strategic, precision, lethal force. This may be true when it is a contest between nations, but in a contest between a nation and a nonstate actor, this meets limited success. Thus, America’s worldview and its Armed Forces must be ready for strategic and tactical wars, both conventional and unconventional.

The real answer lies in establishing a warfighting entity that is impartial with respect to the Services’ ability to handle the acquisition and technology programs for the entire Department of Defense. The logical choice is to place the integration of all military needs under the unified command tasked with determining the training and evaluation needs for joint forces, United States Joint Forces Command. With its overarching view of all the unified commands, it is in the unique position to determine what is necessary to fight and win America’s wars, both in terms of manpower and equipment. Furthermore, it should be charged with ensuring the interoperability of these programs to meet service-specific needs with minimal changes. In this time of limited resources and increasing needs, standardization is required without sacrificing individual service-unique needs. Additionally, a streamlining of the acquisition process is required to ensure timely answers to emerging needs. Without these changes, our system becomes almost as cumbersome as the World War II German system, a system that can (and in the case of World War II, Germany, did) implode if left alone long enough.

### Notes

1. John Killen, *A History of the Luftwaffe*, Garden City, New Jersey: Doubleday and Co, Inc, 1967, picture 13.
2. Walter Schick and Ingolf Meyer, *Luftwaffe Secret Projects, Fighters 1939-1945*, trans Elke and John Weal, Leicester, England: Midland Publishing, 1997, 108.
3. Tom Bower, *The Paperclip Conspiracy: The Hunt for the Nazi Scientists*, Boston, Massachusetts: Little, Brown and Co, 1987, 6.
4. Schick and Meyer, 6.
5. Schick and Meyer, 7.
6. Peter P. Wegener, *The Peenemunde Wind Tunnels: A Memoir*, New Haven, Connecticut: Yale University Press, 1996, 149.
7. Schick and Meyer, 7.
8. Schick and Meyer, 47.
9. *Ibid.*
10. Schick and Meyer, 7.
11. David Donald, ed, *Warplanes of the Luftwaffe*, London: Aerospace Publishing, 1994, 188.
12. Howard Faber, ed, *Luftwaffe: A History*, New York: Times Books, 1977, 175.
13. Werner Baumbach, *The Life and Death of the Luftwaffe*, trans Frederick Holt, New York: Coward-McCann, Inc, 1949, 34.
14. US Strategic Bombing Survey, Interview No 56, Reichmarshal Hermann Goering, 29 Jun 45, 4.
15. Bower, 5.
16. Schick and Meyer, 59.
17. *Ibid.*
18. Baumbach, 171.

*A streamlining of the acquisition process is required to ensure timely answers to emerging needs.*

---

## From First to “Wurst”: The Erosion and Implosion of German Technology During WWII

19. Alfred Price, *The Last Year of the Luftwaffe, May 1944 to May 1945*, Osceola, Wisconsin: Motorbooks International, Publishers and Wholesalers, Inc, 1991, 176.
20. Schick and Meyer, 48.
21. *Ibid.*
22. Donald, 15.
23. Brian Johnson, *The Secret War*, New York: Methuen, 1978, 16-18.
24. Johnson, 18.
25. Johnson, 22.
26. Johnson, 45.
27. Johnson, 59.
28. Johnson, 38.
29. Johnson, 59.
30. Schick and Meyer, 7.
31. Schick and Meyer, 136.
32. *Ibid.*
33. Schick and Meyer, 7.
34. Donald, 94.
35. Bower, 6.
36. Faber, 172.
37. Asher Lee, *The German Air Force*, New York: Harper and Brothers Publishers, 1946, 255.
38. *Ibid.*
39. US Strategic Bombing Survey, Interview No 56, Reichmarshal Hermann Goering, 29 Jun 45, 4.
40. Alan Milward, *The German Economy at War*, London: The Athlone Press at University of London, 1965, 69.
41. US Group Control Council (Germany), Office of the Director of Intelligence, Field Information Agency, Technical, Intelligence Report No EF/Min/1, Subject: Report No 19, Part I, on the Examination of Albert Speer and Members of the former Reich Ministry of Armaments and War Production by O. Hoeffding, 20 Aug 45, 4.
42. Examination of Albert Speer and Members of the Former Reich Ministry of Armaments and War Production, 5.
43. R. J. Overy, *War and Economy in the Third Reich*, Oxford, England: Clarendon Press, 1994, 344.
44. US Strategic Bombing Survey, Interview No 56, 4.
45. Baumbach, 56.
46. Milward, 48-49.
47. Overy, 187.
48. Overy, 177.
49. Baumbach, 34.
50. Lee, 256.
51. Faber, 141.
52. Baumbach, 171.
53. Price, 183.
54. *The Rise and Fall of the German Air Force, 1933-1945*, New York: St Martin's Press, 1983, 407.
55. Baumbach, 30.
56. Milward, 172.
57. US Strategic Bombing Survey, Interview No 56, 4.
58. Lee, 266.

## General George C. Kenney

**K**enney was born in Yarmouth, Nova Scotia, on 6 August 1889. He attended Massachusetts Institute of Technology intermittently from 1907 to 1911. At the outbreak of the *Great War*, he enlisted as a flying cadet. During this time, he downed two German aircraft, for which he received the Distinguished Service Cross. He remained with the occupation forces in Germany after cessation of hostilities until June 1919 when he was sent to the United States and reassigned to the 8<sup>th</sup> Aero Squadron at McAllen, Texas.

Between the wars, he attended the Command and General Staff College and the Army War College and then taught at the Air Corps Tactical School. He became an accomplished engineer through assignments at Wright Field and was recognized as an expert in tactical aviation. While serving as an air attache in Paris during the German invasion of France in 1940, he witnessed firsthand the effectiveness of airpower.

Kenney was MacArthur's top airman in the Pacific during World War II. In the Battle of the Bismarck Sea in early March 1943, he planned and directed the attack of B-17 bombers, which sank 16 Japanese vessels in a convoy with only minor losses to US aircraft. His successes in this and other battles such as Rabaul, Wewak, and the Philippine campaign were dramatic, and he has become the prototype for the modern concept of an air component commander, the one individual in charge of all aviation assets in a theater. Kenney's grasp of what is now called *operational art* and how airpower could be used to complement the operations of land and sea forces was renowned, and he was considered by many to be the most accomplished combat strategist of the war. When promoted to full general 9 March 1945, he was one of only four airmen holding that rank.

After the war, General Kenney was assigned to the Military Staff Committee of the Joint Chiefs of Staff and sent to London for the duration of the UN Conference. He continued with the Military Staff after his return to the United States. In April 1946, he was designated commanding general of the Strategic Air Command. On 15 October 1948, General Kenney assumed the position of commander, Air University, where he remained until his retirement from the Air Force on 31 August 1951. He continued to serve military affairs and the nation as president of the Air Force Association in 1954 and as an official with national charities. Kenney died 9 August 1977.



[Online] Available: <http://home.st.net.au/~dunn/ozatwar/kenney.htm>; <http://www.af.mil/bios/bio.asp?bioID=6041>; and <http://www.airpower.maxwell.af.mil/airchronicles/cc/biograph.html>



**T**he series of engagements in and around the Kasserine Pass in Tunisia marked the first time American forces engaged in full-scale combat against German forces in the Second World War. As they entered the campaign, the general feeling among the Americans was one of great confidence in their ability to rapidly defeat the Axis forces arrayed before them in the North African desert. A recent study argues, "The American military had been animated mostly by can-do zeal and a desire to win expeditiously; these traits eventually would

help carry the day but only when tempered with battle experience and strategic sensibility."<sup>1</sup> However, at Kasserine, "Axis troops ... struck a blow and delivered a crushing defeat ... on the Americans and the French."<sup>2</sup>

### Introduction

In combat encounters comprising the Battle of Kasserine Pass, "German and Italian troops drove French and American soldiers from the Eastern Dorsale mountain range 50 miles across the Sbeitla Plain to the Western Dorsale,

# BATTLE OF THE



where the Allies stopped the attack and prevented the Axis from expanding a tactical triumph into a strategic success.”<sup>3</sup> Following on the heels of the early success of Operation Torch and the Allied drive into Tunisia, the American military believed it had demonstrated its combat prowess, and the defeat at Kasserine proved to be a shock to both the Army and the public at home. In his treatise on the Battle of Kasserine Pass, Martin Blumenson asserts, “To the American people, the event was incredible. It shook

the foundations of their faith; extinguished the glowing excitement that anticipated quick victory; and worst of all, raised doubt that the righteous necessarily triumphed.”<sup>4</sup>

Using personal papers and reflections of Army Captain Ernest C. Hatfield as a primary source, this article will analyze the Battle of Kasserine Pass from an operational perspective to determine why the Allied forces were dealt such a defeat. Specifically, it will examine operational aspects of the battle and the North African campaign to include logistics issues, failures on the part of the Allies to adhere to principles of war, problems with the use

**Major Vincent M. Carr, Jr, USAF**

# KASSERINE PASS

## Examining Allied Operational Failings





## Battle of the Kasserine Pass: Examining Allied Operational Failings



*American military leadership was not sold on the logic or necessity of a North African campaign.*

of intelligence information, and general failings on the part of various American and Allied military leaders throughout the theater of operations. Also discussed briefly will be how this defeat, combined with experiences throughout the Tunisian campaign, proved to be a great learning laboratory, providing invaluable lessons for prosecuting the war in Europe.

### Background

To justly analyze the Battle of Kasserine Pass, it is first necessary to place the battle in the larger context of the Allied campaign in North Africa. For the Americans, the war in North Africa began 8 November 1942 with the execution of the invasion plan for Operation Torch. On 8 November, three Allied task forces—whose objectives were to seize Morocco, Algeria, and Tunisia—invaded French North Africa. Allied forces for the operation consisted of three separate task forces: the Western Task Force, which was to land on the coast of Morocco, near Casablanca; the Central Task Force landing in Algeria, which had the seizure of Oran as its primary objective; and the Eastern Task Force, which was to land near Algiers.<sup>6</sup> Meanwhile, as these Allied forces landed in northern and western Africa, the British Eighth Army was driving from Libya in the east, pushing Rommel's panzer army before it. The Allies hoped to catch and destroy these forces between the two advancing armies.

### From Torch to Tunisia

The objectives of Operation Torch were not simply military in nature, as planning for the operation had been rife with political gamesmanship among the leaders of the Allied nations. The decision to invade North Africa “reflected the triumph of British strategic arguments over those of the Americans” as the Americans were pushing for an invasion in northern France as early as 1942.<sup>7</sup> American military leadership, however, was not sold on the logic or necessity of a North African campaign. General George C. Marshall, the architect of American military strategy, wanted no part of a US commitment to a Mediterranean campaign.<sup>8</sup> The decision to commit American troops in North Africa came directly from President Franklin D. Roosevelt, who overruled the advice of Marshall and his military advisers on this point.<sup>9</sup>



Figure 1. Allied Landing Sites for Operation Torch<sup>5</sup>

As the operation began, the Americans and British hoped the French would not resist the Allied landings and, further, expected French forces in North Africa would rejoin the anti-Axis alliance. To facilitate these hopes, the Allies designated General Dwight D. Eisenhower to command the invasion forces. With an American general leading the forces, the Allies sought to restrict any resistance from Anglophobic French officials and officers in the areas around the invasion beaches and ports.<sup>10</sup> Despite such measures, however, the French did put up some level of resistance at nearly every landing point. Nonetheless, dissension among the various French factions in North Africa limited the cohesiveness and effectiveness of the opposition. Ultimately, the magnitude and rapidity of the Allied invasion narrowly ensured the success of the invasion, though much was still required to bring together the warring French factions.<sup>11</sup>

Once the beachheads had been established, however, most French forces quickly switched alliance to the Allied effort. By 13 November, a workable agreement had been achieved among the Americans, British, and French. As a result, the Allies achieved their major objective—garnering the immediate assistance of French forces in North Africa to support American and British forces in liberating Tunisia.<sup>12</sup> With their forces consolidated, the Allies turned to the east and began the race for Tunisia. After accomplishing the landings, the Allied plan called for Lieutenant General Kenneth N. Anderson to assume command of British forces under the banner of the British First Army. Meanwhile American forces came under the control of Major General Lloyd Fredendall’s II Corps. The Western Task Force, under Major General George S. Patton, Jr, remained in Morocco, engaged in training.<sup>13</sup> The initial drive into Tunisia was to fall to Anderson and the British First Army, assisted by American units and coordinated with the French forces.<sup>14</sup> In theory, Anderson represented British (and Allied) combat experience in the theater, as compared to the untested American leadership.<sup>15</sup> However, the Allied march into Tunisia would not be uncontested, as Axis forces from Sicily and Italy began pouring into Tunisia and established a bridgehead of their own along the eastern seaboard.<sup>16</sup>

**Allied Chain of Command**

Allied forces driving into Tunisia faced other difficulties beyond just Axis forces, one of which was the disjointed chain of command that existed among the coalition armies. Part of the problem stemmed from the recent addition of French forces into the Allied coalition. Harboring strong anti-British sentiments, “The French flatly refused to serve under the British” and “would take no orders from Anderson.”<sup>17</sup> With the exception of Eisenhower, who was primarily engaged in political matters related to transition of control of the French North African colonies, none of the American commanders in North Africa had the prestige or combat experience to be placed over Anderson. As a result, “The enormous advantage of a unified direction supplied by a single commander was lost;” instead, “A hopeless intermingling of the three Allied forces would soon develop along the front, a thoroughly unsound military practice.”<sup>18</sup>

**Battle of the Kasserine Pass:  
Examining Allied Operational  
Failings**

Introduction ..... 120

Background ..... 122

The Role of Logistics ..... 127

Violating the Principles of  
War ..... 129

The Role of Leadership ..... 133

Lessons Learned ..... 136

Summary ..... 138

---

## Battle of the Kasserine Pass: Examining Allied Operational Failings

*A hopeless intermingling of  
the three Allied forces would  
soon develop along the front,  
a thoroughly unsound  
military practice.*

Within a day of landing in North Africa, the British First Army, along with various American elements, began its move eastward into Tunisia. By 14 November, Anderson had moved his forces into western Tunisia and planned to conduct attacks on Tunis and Bizerte within the week. Despite intelligence gleaned from Ultra intercepts, the Allies grossly had underestimated the strength and capabilities of the German forces opposing them in northern Tunisia. Additionally, the Allies failed to heed information that Axis forces were expanding their bridgehead to the west. Having missed such evidence, Anderson pressed forward with an offensive plan to cut the Axis forces in half, isolating Bizerte, which was to be captured after Tunis had fallen. As a result, the Allies did not mass their forces into a more compact front and instead pushed their forces ahead on a broad, thin front.<sup>19</sup> Consequently, on 17 November, as Allied forces approached to within 45 miles of Bizerte, several Allied elements ran into Axis troops. Some Allied contingents would get as close as 15 miles from Tunis at the end of November, but the Allies had missed the opportunity to gain Tunisia without combat.<sup>20</sup>

### To Kasserine Pass

For the next month, the First Army, as well as contingents of the American 1<sup>st</sup> Armored Division that had moved east from Oran, fought a number of small skirmishes against German forces in the mountains and desert of northern Tunisia. However, the Allied forces were unable to gain either Tunis or Bizerte and failed to split the German bridgehead. By Christmas Eve 1942, Eisenhower realized the Allies had lost the race for Tunis.<sup>21</sup> During the last several weeks of 1942 and the first 6 weeks of 1943, both the Allied and Axis armies sparred along the front in an attempt to improve their respective positions in central Tunisia.<sup>22</sup>

In late December, the Allies were forced to indefinitely postpone offensive operations in Tunisia because of bad winter weather, poor logistics, and poorly integrated air and land operations, including the distance of usable airfields from the Tunisian front.<sup>23</sup> With operations halted in northern Tunisia, Eisenhower looked farther south as an area to potentially continue an Allied offensive. In the area between Tebessa and Kasserine, Eisenhower sought to give the American forces a front of their own, while reinforcing French forces in the region and putting up a roadblock against anticipated offensive action by Rommel's forces.<sup>24</sup> By mid-January 1943, these moves by the Allies set the stage for what was to occur in the upcoming battles for Sidi bou Zid and Kasserine Pass.

**Battles of Sidi bou Zid and Kasserine.** Through much of the month of January, Axis attacks puzzled Allied commanders as Axis forces often abandoned key positions and tended to limit their own advances. At the end of January, German forces attacked the French, who were defending Faïd Pass. This attack disrupted Allied plans for an offensive drive against Maknassy, as Allied commanders were torn whether to continue their planned offensive or move armored forces to the Faïd Pass region to mount a counterattack on the Germans.<sup>25</sup>



---

## Battle of the Kasserine Pass: Examining Allied Operational Failings

The indecision and confusion of the Allies allowed the Germans to continue their attack. On 14 February 1943, German forces attacked American and French positions in southern Tunisia. The German 21<sup>st</sup> Panzer Division struck westward against Combat Command A of the US 1<sup>st</sup> Armored Division at Sidi bou Zid, 10 miles west of Faïd. With more than 200 tanks on both sides, a protracted battle appeared in the making. However, American armor was thinly dispersed, and the German and Italian armor drove through in only 1 day. American forces mounted an ineffective counterattack the next day, but the demoralizing capture of some 1,400 troops forced them to withdraw. Enemy pressure only eased as the 1<sup>st</sup> Armored Division fell back.<sup>26</sup>

Hatfield, an aide to Major General Orlando Ward, commander of the 1<sup>st</sup> Armored Division, captured the events of 14 February in his diary.

Awakened at 0700 hrs by telephone call from CCA. Germans are attacking Lessouda in force with tanks and artillery. Stukas bombing their CP. Tanks (30 German) surrounded Lessouda hill and overran B Battery of 91<sup>st</sup> Field Artillery. Thirty tanks striking south from Lessouda toward Sidi bou Zid—unknown number of tanks striking toward us at Sbeitla ... Fighting is very hard, and bombing is ongoing. Our air support isn't too good. Hightower reported only five medium tanks left in one company, one company is unheard from and another is unheard from, and there is no information about it. General [Ward] asked Corps for reinforcements ... they got here about 1230 hours.... I got a report from Dixon, II Corps G-2, that reconnaissance elements of the 21<sup>st</sup> Panzer were on the Sidi bou Zid-Gafsa road ... and that 34 enemy tanks were seen at 1300 hrs coming toward Sbeitla.<sup>27</sup>

The Allies could neither initially contain the advancing panzer forces nor get reinforcements into position in time. On 16 February, Axis forces resumed their push to the west, seizing Sbeitla, nearly 25 miles beyond Sidi bou Zid. Again, the Americans scrambled back to establish a new defensive position, this time at Kasserine Pass.<sup>28</sup> However, partly because reinforcements did not arrive in time, the engagement at Sidi bou Zid quickly turned into a rout as position after position was attacked and overrun.<sup>29</sup> Hatfield wrote:

Col Stack's force, 1 BN INF, 2 TD companies, 1 btry FA, and 1 co medium tanks, plus Col Alger's medium tank battalion, are coming down around Lessouda ... and made contact with the enemy ... Alger contacted 40 enemy tanks south of Sidi bou Zid. Stack withdrew to Kerns bivouac... Stack was to remain and help Drake get his 1,500 men from Djebel Ksaira... As for the men on Lessouda, a message was dropped to them by plane to withdraw to Kerns' area at the crossroads.<sup>30</sup>

Rommel hoped to send his armored columns through the central Tunisian passes of Faïd and Kasserine, then turn northwestward to the Allied supply depot at Tebessa before swinging north to the Algerian coast, with the intent of trapping the British First Army in northern Tunisia. Rommel, seeing an opportunity to keep the battered Allied forces reeling, continued his push for an even bigger prize: Kasserine Pass, gateway to Algeria. On 19 February, with the addition of the 10<sup>th</sup> and 21<sup>st</sup> Panzer Divisions to his panzer army, Rommel struck the II Corps. By the next afternoon, Axis forces had seized Kasserine Pass. Only the valiant stands

*The Allies could neither initially contain the advancing panzer forces nor get reinforcements into position in time.*

## Battle of the Kasserine Pass: Examining Allied Operational Failings

*Rommel hoped to send his armored columns through the central Tunisian passes of Faid and Kasserine.*

of individual battalions and companies on isolated hilltops interrupted Rommel's progress.

In addition to defeats in the field, American forces were suffering from low morale, indicated by the huge stocks of equipment abandoned in their rush to fall back.<sup>32</sup> The *Army Center of Military History* brochure on the Tunisian campaign asserts, "In a final insult, the disastrous series of defeats was ended not by stiffening American resolve but by a shift in Axis priorities."<sup>33</sup> Although the Germans were successful in the first week of their counteroffensive, Rommel's forces did not have the fuel to continue the advance, and he also was forced to turn back to the east to defend against Montgomery's Eighth Army as it advanced into southern Tunisia.<sup>34</sup> The Americans had suffered humiliating defeats, with II Corps suffering nearly 6,000 casualties at Sidi bou Zid and Kasserine before

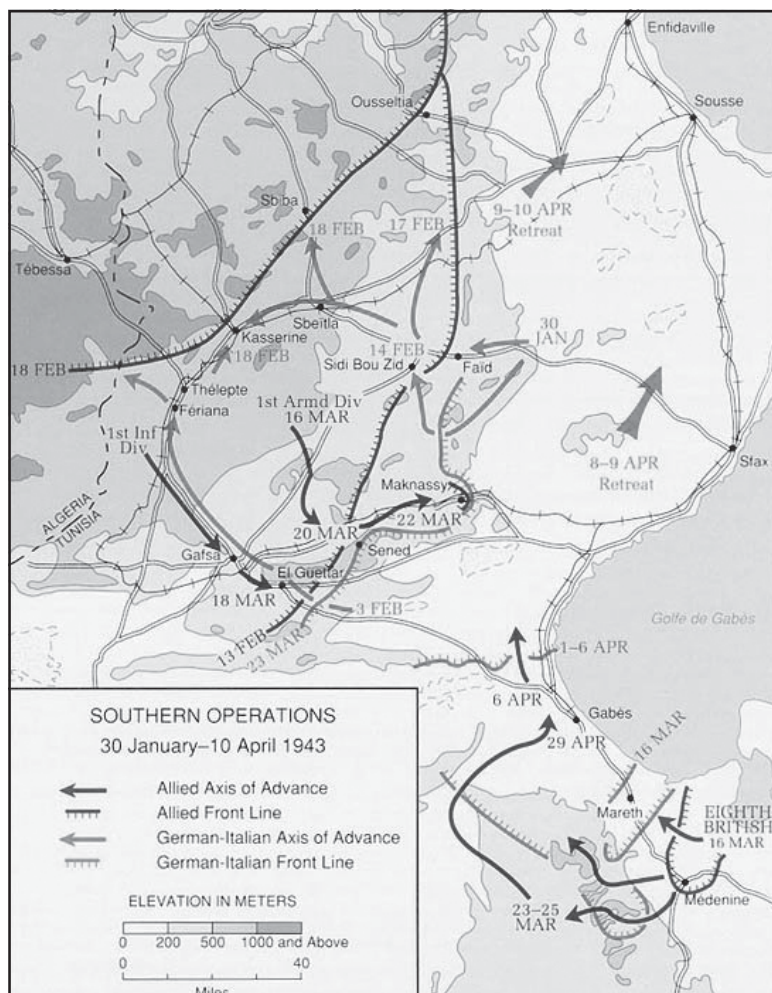


Figure 2. Southern Tunisia, January-April 1943<sup>31</sup>

---

Rommel's army had been forced to disengage and pull back from their advances.<sup>35</sup>

## Battle of the Kasserine Pass: Examining Allied Operational Failings

### The Role of Logistics

As discussed earlier, the initial defeat of the II Corps at Kasserine and Sidi bou Zid was a shock to the Army and the general public. However, by examining some of the operational constraints, as well as operational decisions made by the American and Allied leaders, one can begin to see how these issues contributed to the defeat at Kasserine. One such contributing factor to the Allied failure at Kasserine was logistics. One of the greatest challenges for the Allied forces in their operations across North Africa and in Tunisia proved to be logistics. As the Allies moved into Tunisia, their original aim was to seize lines of communication, as well as gain control of the port cities. Additionally, they intended to trap and destroy Rommel's army. However, these operational and strategic objectives soon fell by the wayside, as Allied logistics problems came to a head. Eventually, Eisenhower realized his most pressing task was not strategy but overseeing the complex logistical requirements that began with organizing a transportation system between Algeria and Tunisia.<sup>36</sup>

#### The Logistics Trail

Much of the logistics problem stemmed from decisions made during the planning for Operation Torch. Eisenhower and his deputy, Lieutenant General Mark W. Clark, had assumed the Torch forces would act primarily as an occupying army rather than an offensive striking force. In planning for Torch, Eisenhower and Clark had ignored the recommendations of their logisticians, choosing to devote limited shipping space to tens of thousands of extra troops, at the expense of vehicles and arms. The forces they had planned to use as an army of occupation were now compelled to act as an offensive army. However, because of the acute shortage of vehicles, most units were immobile.<sup>37</sup> In planning for the North African campaign, the overconfident Americans believed there would be little significant resistance and felt they would achieve their objectives of securing Morocco, Algeria, and Tunisia by Christmas. This was not to be the case.

In addition to planning errors, Allied logistics were complicated by the distances that had to be traversed from port cities to the Tunisian front. During the Torch operation, Algiers was the easternmost port city captured by the Allies. However, it was nearly 500 miles from Algiers to the developing front in Tunisia. "The distance from Algiers to the Tunisian battlefield was vast, and the road net was extremely primitive....Along the Mediterranean ran the only railroad, originally built by the French and in uncertain condition....Resupply was to become the single most difficult problem facing the Allies during the Tunisian campaign."<sup>38</sup> Resupply problems were not limited to the Tunisian front, however, but were afflicting Allied troop concentrations throughout the theater. Writing

*Eisenhower realized his most pressing task was not strategy but overseeing the complex logistical requirements that began with organizing a transportation system between Algeria and Tunisia.*

---

## Battle of the Kasserine Pass: Examining Allied Operational Failings

*Logistics support problems  
were most hurtful to units  
that were conducting front-  
line operations.*

from Oran on 7 January 1943, Hatfield states, “This city is so far in advance of main supply that everything is hard to get.”<sup>39</sup> Again, on 8 January, Hatfield writes, “Went to II Corps Hq with General Ward to see how Combat Command B is being supplied. They aren’t...CCB are eating into reserve supplies.”<sup>40</sup>

### **Wasted Forces in Morocco and Algeria**

Logistics support problems were most hurtful to units that were conducting front-line operations. Food, fuel, and ammunition were absolutely essential to the continuance of combat operations in Tunisia. Nonetheless, the Allies’ immature logistical system was unable to resupply any large force to the east. Accordingly, nearly two-thirds of the combat forces that landed in Operation Torch were still in western Morocco and unavailable for combat commitment.<sup>41</sup> The inability of the Allies to supply and support additional troops in Tunisia eventually resulted in further fragmentation of American forces along the Tunisian front.<sup>42</sup> The fragmented forces of the II Corps on the southern flank of the Allied front were “deployed across a large area ... vulnerable to attack and defeat in detail by superior Axis forces.”<sup>43</sup>

To alleviate the poor disposition of Allied forces along the Tunisian front, both Anderson and General Henri Giraud, commanding the French sector in the center of the Allied front, requested reinforcements. Giraud requested that Eisenhower move the 2<sup>d</sup> Armored Division from Morocco to the front. However, Eisenhower was still at the mercy of the poor logistics, so additional combat forces could not be supported in Tunisia at this juncture.<sup>44</sup> As no reserve forces would be moving forward from rear echelons, Anderson ordered to have the French sector reinforced with elements of the American 1<sup>st</sup> and 34<sup>th</sup> Infantry Divisions and the British 1<sup>st</sup> Guards Brigade, with Combat Command B of the 1<sup>st</sup> Armored Division held in reserve.<sup>45</sup> The inability of the Allies to bolster their front with reinforcements resulted in forces’ being deployed very thinly across the central and southern Tunisian front and allowed the German and Italian panzer forces to execute rapid breakthroughs in capturing Faid Pass, Sidi bou Zid, Sbeitla, and Kasserine Pass.

### **Violating the Principles of War**

Logistics problems alone did not fashion the situation for failure of the Allied forces in Tunisia, however. The operations of the Allies were also hampered because they violated several principles of warfare in this campaign. Specifically, the principles of mass, unity of command, and security were not applied properly in this scenario, hindering the efforts of the Allies.

#### **Mass**

Current Army doctrine defines mass as concentrating the effects of combat power at the decisive place and time. Field Manual 3-0 states, “Commanders mass the effects of combat power to overwhelm enemies

## Battle of the Kasserine Pass: Examining Allied Operational Failings

or gain control of the situation.”<sup>46</sup> Rather than being massed, however, the II Corps was deployed thinly across a large area, increasing its vulnerability to attack and defeat by the superior Axis forces.<sup>47</sup> Instead of establishing defense in depth, American infantry forces were spread across isolated djebels (hills), and both armored and infantry reserves were likewise scattered in small pockets along the front.

The penalty for these unsound dispositions was paid in February, when Axis units inflicted disastrous defeats at Sidi bou Zid and Kasserine Pass. Two of von Arnim’s [Colonel General Jurgen] veteran panzer divisions surprise-attacked with vastly superior firepower and quickly chewed up units of the 1<sup>st</sup> Armored Division at Sidi bou Zid. American units were deployed in so-called penny-packet formations (independent, self-contained, self-supporting, brigade-size forces) that the British had used with disastrous consequences in 1941-42 ... Farther south a German-Italian battle group of Rommel’s Afrika Korps advanced with little opposition and attacked US forces defending the Kasserine Pass, with equally grave consequences. There the American commander had not bothered to occupy the commanding terrain of the hillsides but instead had deployed his troops across the valley floor.<sup>48</sup>

As previously mentioned, part of the problem with the disposition of forces stemmed from the Allies’ limited ability to resupply the forces or bring in reinforcements to shore up the lines along the Tunisian front. Regardless of such shortages, Fredendall, as II Corps Commander, should have deployed the troops better in the field. Instead, the penny-packet deployments resulted in pockets of troops surrounded and cut off during the battle, as was the case with American forces on Djebels Ksaira and Lessouda. Writing on 16 February, Hatfield states, “We had a battalion of infantry trapped on Djebel Lessouda, and Col Drake had 1,500 men trapped on Djebel Ksaira. About 450 got off Lessouda, but we did not have the power to get Drake out.”<sup>49</sup> The penny-packet disposition of forces resulted in the capture or slaughter of various elements of the 1<sup>st</sup> Armored and II Corps. Rick Atkinson argues, “The folly of the Allied battle plan was clear: after losing Faid Pass in late January, the Americans should have either recaptured the Eastern Dorsal—at whatever cost—or retired to defensible terrain on the Grand Dorsal. Instead, they had dispersed across a vulnerable open plain where the enemy could defeat them in detail.”<sup>50</sup>

*The penny-packet disposition of forces resulted in the capture or slaughter of various elements of the 1<sup>st</sup> Armored and II Corps.*

### Unity of Command

The principle of mass was not the only principle of war misapplied by the Allies in the Tunisian campaign. Unity of command directs that “for every objective, ensure unity of effort under one responsible commander.”<sup>51</sup> The purpose of unity of command is to direct and coordinate actions of forces toward a common objective. However, in a coalition environment, “Unified action creates situations where the military commander does not directly control all elements in the area of operations. In the absence of command authority, commanders cooperate, negotiate, and build consensus to achieve unity of effort.”<sup>52</sup> As has already been mentioned, the Allies were having great difficulty in ensuring unity of effort, let alone unity of command in North Africa.



---

## Battle of the Kasserine Pass: Examining Allied Operational Failings

*The purpose of unity of  
command is to direct and  
coordinate actions of forces  
toward a common objective.*

**Coalition Warfare.** When engaged in coalition warfare, national interests, as well as desires for publicity and prominence, tend to dominate the relationship among allies.<sup>53</sup> Achieving unity of command is nearly impossible in coalition warfare as it “is circumscribed by a special kind of courtesy that inhibits unified, cohesive, and quick action.”<sup>54</sup> Despite Eisenhower’s attempts to create a truly Allied command structure in North Africa, all that he was able to achieve was a loose coalition. Field commanders were confronted with often insoluble problems stemming from differences in national interest and outlook, as well as individual personality and character.<sup>55</sup> Discussing the role of leadership in coalition warfare, Martin Blumenson argues:

The exercise of command is not only a matter of organizational structure, doctrine, and authority; it is also a matter of personality—each commander commands in a personal manner. In times of tactical success, frictions among men tend to be overlooked or minimized; in times of operational adversity, annoyances develop into irritations and contribute their own influences on a deteriorating situation.<sup>56</sup>

The latter situation was very much the case in late January to mid-February 1943 within the Allied structure.

Eisenhower was generally able to control such problems at Allied Force Headquarters (AFHQ), but field commanders had greater difficulty controlling these problems. Part of the problem with unity of effort stemmed from the way combat troops had been employed. On several occasions, US troops were employed in piecemeal fashion, with little regard for unit integrity, and merged with British elements. Additionally, American commanders and soldiers believed the British were being favored in the choice of missions, equipment, and supplies.<sup>57</sup> For example, Hatfield wrote, “British 6<sup>th</sup> Armored Division, with the First Army, is getting new M-4 tanks while we are receiving M-3s as replacements. Our boys get the short end of the deal.”<sup>58</sup> Such feelings went both ways, however, as the British felt they were being slighted in favor of the Americans. For example, Anderson and his chief of staff felt the eventual First Army drive to Tunis was the imperative mission for the Allies, any resources being shifted to Fredendall could potentially sidetrack this offensive.<sup>59</sup>

**Contempt and Distrust.** Beyond piecemeal troop employment and feelings of jealousy among the national armies, various commanders often harbored feelings of contempt and distrust of their Allied counterparts. Anderson believed the French were extremely sensitive and felt compelled to act in a conciliatory manner toward them. At the same time, he lacked confidence in their combat ability, primarily because of their inferior equipment.<sup>60</sup> Additionally, there were problems with fitting the French forces into the overall Allied force structure. Because of the division of the Tunisian front into various sectors (British First Army in the north and the II Corps in the south), there was consternation regarding command arrangements for the French XIX Corps in the center of the line and also

the French Constantine Division, which was operating within II Corps' area of responsibility.<sup>61</sup>

Such feelings were not restricted to the British, however, as several American commanders also did not disguise their feelings about their British allies. Fredendall, in particular, proved to be an impediment to resolving problems of interallied cooperation and command. Blumenson states, "He turned out to be an Anglophobe in general, and he disliked Anderson in particular. He had no confidence in and little patience with the French... Nor did he appreciate the frustration of men who were denied the weapons they needed to fight."<sup>62</sup> Although other American officers harbored feelings of ill-will toward their British counterparts, in many instances these feelings were held in check and did not come out until they published postwar memoirs. Overall, despite the problems that occurred in the Anglo-American alliance during the Tunisian campaign, Martin Blumenson argues the alliance flourished. "It was the strongest coalition in the history of warfare. Despite grumbling on the part of disenchanted individuals, despite real and serious divergence of approach to strategy and policy, the partnership and the machinery that ran the military side functioned well and on every level."<sup>63</sup>

## Security

In addition to contravening the principles of mass and unity of command, the Allies were guilty of ignoring aspects of the principle of security with regard to their actions in central Tunisia. Army Field Manual 3-0 defines security as protecting and preserving combat power by never permitting the enemy to acquire an unexpected advantage.<sup>64</sup> In terms of the Battle of Kasserine Pass, one can regard the Allied failures to use various sources of intelligence to build a composite picture of the battlefield as a violation of the tenet of security.

The primary issue regarding Allied use of intelligence was their overreliance on data from Ultra intercepts. The most glaring instance of this reliance occurred shortly before the Battle of Kasserine Pass commenced when intelligence officers of Allied Force Headquarters misinterpreted Ultra information that ran counter to what was being reported by other sources of intelligence.<sup>65</sup> Through Ultra intercepts, the AFHQ intelligence officer (G-2) learned of the large German buildup behind the Eastern Dorsale and expected an offensive soon but believed Rommel would attack farther to the north at Fondouk, with diversionary attacks at Faïd and Gafsa.<sup>66</sup> As a result, combat commands of the 1<sup>st</sup> Armored Division were shifted northward to Fondouk to meet the perceived threat.

Brigadier Eric E. Mockler-Ferryman was in charge of intelligence analysis at AFHQ. Intelligence regarding the posturing of German forces along the Eastern Dorsale had been decoded by Ultra in England and relayed to Mockler-Ferryman in Algiers.<sup>67</sup> However, there had been changes made at the Italian Comando Supremo in early February, reducing the ability of AFHQ to acquire and access routine signal traffic of the enemy

## Battle of the Kasserine Pass: Examining Allied Operational Failings

*It was the strongest coalition in the history of warfare.*

---

## Battle of the Kasserine Pass: Examining Allied Operational Failings

*Because of the muddled  
nature of available data,  
Mockler-Ferryman's staff  
drew the wrong conclusions  
from the details provided  
from Ultra.*

forces.<sup>68</sup> As a result, Mockler-Ferryman and his staff were relying primarily on Ultra intercepts flowing from Bletchley Park to build their battlefield intelligence picture. Because of the muddled nature of available data, Mockler-Ferryman's staff drew the wrong conclusions from the details provided from Ultra. They passed information to the front that Axis forces could be expected to organize a major assault at the Fondouk Pass in the Eastern Dorsal.<sup>69</sup>

Based on the information received from AFHQ G-2, Anderson ordered the deployment of Allied forces along the front in an attempt to block the perceived threat at Fondouk. On 14 February, First Army Headquarters flashed a message along the Allied front, warning of the impending German attack at Fondouk, with expected diversionary attacks elsewhere along the front.<sup>70</sup> Anderson was unaware that the warnings of an attack at Fondouk were based on excessive reliance on Ultra. Thus, he was surprised when Colonel Dickson, II Corps' intelligence officer, provided an estimate, based on battlefield reconnaissance, that the attack would take place farther south, at either Faïd or Gafsa.<sup>71</sup>

Eisenhower also had fallen victim to this reliance on Ultra intercepts to assess the battlefield situation. On the night of 13 and 14 February, Eisenhower visited the Tunisian front, stopping at the 1<sup>st</sup> Armored Division headquarters of Ward in the vicinity of Sbeitla. While there, Brigadier General P. L. Robinett, commander of 1<sup>st</sup> Armored's Combat Command B, reported "He had patrolled that [Fondouk] whole area and was convinced that the expected enemy attack would come farther south, at Faïd Pass."<sup>72</sup> Despite the reconnaissance strongly suggesting the Germans would attack elsewhere, an ambush was laid at Fondouk. But, as already discussed, the Axis armies struck through Faïd on the morning of 14 February, then split their forces to envelop and destroy a combat command of the 1<sup>st</sup> Armored Division at Sidi bou Zid.<sup>73</sup>

### The Role of Leadership

In reviewing these various failings at the operational level of war, one must also assess the leadership of the Allies to determine why such errors could occur. This research will look specifically at the leadership of Eisenhower as the theater-level commander and that of Fredendall as the commander of the II Corps. In particular, with Fredendall, the focus will be on his relationship with Major General Orlando Ward, who served under Fredendall as the 1<sup>st</sup> Armored Division commander.

#### Eisenhower

Several historians who have written about the Allied campaign in North Africa and the Battle of Kasserine Pass argue the failures of American leadership begin with Eisenhower. Carlo D'Este asserts Eisenhower "continued to exhibit the uncertainties of inexperience of high command, manifested by a tendency to interfere on the battlefield and in his hesitation

to address the growing problems within II Corps.”<sup>74</sup> Others argue that:

... responsibility for the American disaster at Kasserine ultimately rests with Eisenhower for sanctioning, by default, the thinly spread deployment of the US II Corps. After a personal visit before the German attack at Kasserine, he expressed dismay at the dispositions but did nothing, possibly lacking the experience to correct the flaws in the layout and the confidence to ‘grip’ and ‘sort out’ the commanders responsible.<sup>75</sup>

Perhaps the most cutting critique of Eisenhower’s leadership relates to his failure to address the command situation with the II Corps in the Tunisian campaign. Marshall had identified Fredendall as a rising star and held him in high regard. Eisenhower, too, initially held Fredendall in high regard, but Fredendall proved to be an appallingly inept commander. D’Este attests, “Fredendall was utterly out of touch with his command, stonewalled any attempt at cooperation with Anderson, feuded constantly with his subordinate commanders, and generally broke every known principle of leadership in the employment of his corps.”<sup>76</sup> Despite recognizing the problems with Fredendall, Eisenhower delayed in his responsibility to relieve him of command, a decision with dire consequences for the American forces under Fredendall at Kasserine Pass.

In addition to his hesitancy in resolving problems with subordinate commanders, Eisenhower tended to be rather tentative and risk averse as the commander of the Allied North African campaign. Stephen Ambrose assessed Eisenhower in the following manner:

Eisenhower might have done better in his first command had he left behind him the emphasis on an orderly, systematic advance that he had imbibed at C&GS, and instead adopted the attitude Patton had expressed back in 1926, when he told Eisenhower always to remember that “victory in the next war will depend on EXECUTION not PLANS.” But Eisenhower had been a staff officer for twenty years and could not shake the patterns of thought that had become second nature to him. He concentrated on administrative matters and politics, and insisted on an orderly, rather than a bold and risky, advance, even when his superiors urged him to take more chances....In his first command experience, Eisenhower had shown both strengths and weaknesses. His greatest success had been in welding an Allied team together, especially at AFHQ....But at the point of attack, he had shown a lack of that ruthless, driving force that would lead him to take control of a tactical situation and, through the power of his personality, extract that extra measure of energy that might have carried the Allies into Tunis or Sardinia.<sup>77</sup>

Part of the problem confronting Eisenhower was he had become caught up in running AFHQ, shuffling paper, and coping with political consequences from Torch. Instead of focusing his attention on the duty of running the battle in Tunisia, which could not be accomplished from Algiers, 400 miles away, Eisenhower was overly engaged in the political aspects of Allied command.<sup>78</sup>

Following the Battle of Kasserine Pass, however, Eisenhower proved to be a quick study and showed his willingness to institute change and learn from his mistakes. The overall conduct of the Allied campaign in

## Battle of the Kasserine Pass: Examining Allied Operational Failings

*Eisenhower continued to exhibit the uncertainties of inexperience of high command, manifested by a tendency to interfere on the battlefield and in his hesitation to address the growing problems within II Corps*

---

## Battle of the Kasserine Pass: Examining Allied Operational Failings

*Eisenhower was overly  
engaged in the political  
aspects of Allied command.*

Tunisia in late 1942 and January-February 1943 forced Eisenhower to reexamine Allied organization and plans. Eisenhower quickly restructured the Allied command and made key personnel changes among Allied leadership.<sup>79</sup> For example, shortly after the Kasserine campaign, Eisenhower sent Major General Ernest Harmon to assess the situation at II Corps with respect to Fredendall's ability to retain command. Additionally, Harmon was to evaluate whether the failures at Kasserine were attributable to Fredendall or to Ward at the 1<sup>st</sup> Armored Division. After receiving Harmon's assessment, Eisenhower relieved Fredendall, replacing him with Patton as the new II Corps commander.

### **Fredendall**

While it is certainly correct that Eisenhower, as the Allied commander for operations in Tunisia and North Africa, must bear a portion of the responsibility for the Allied failure, he was by no means the only American commander who was found lacking in this first engagement of the war. Fredendall, commanding officer of the II Corps, was also culpable for a portion of the Allied failures at Kasserine and Sidi bou Zid. D'Este argues that Fredendall was one of the most inept senior officers to hold a high command in World War II. "He was completely out of touch with his command, had balked at cooperating with Anderson, and failed to make a positive impact on his troops or subordinate commanders with whom he feuded constantly, particularly Orlando Ward [Major General] of the 1<sup>st</sup> Armored, who despised him."<sup>80</sup> Two primary aspects of his leadership that come into question were his relationship with Ward and his related tendency to centralize control and execution of combat activity.

**Relationship with Ward.** Martin Blumenson asserts Fredendall was often vague and imprecise in his orders and continually usurped the authority and function of his subordinate commanders.<sup>81</sup> This was particularly the case in his dealings with Ward at the 1<sup>st</sup> Armored Division. American military doctrine, espousing the virtues of centralized control and decentralized execution, maintains, when a commander assigns a mission, he gives subordinate commanders the initiative and authority to carry out the mission in their own way. However, Fredendall tended to violate this construct of leadership when giving direction to Ward. For example, Fredendall provided precise instructions to Ward on the deployment of troops to defend Djebels Ksaira and Lessouda, covering subjects such as proper employment of patrols, the importance of aerial photography, and the function of artillery, among other topics—all of which were subjects that junior officers were known to have mastered.<sup>82</sup>

Hatfield provides several other illustrations of such interventionist leadership on the part of Fredendall. Writing from the Sbeitla area on 9 February 1943, Hatfield states, "Fredendall ordered Col King of 701 to command CCD and Col Maraist to come back to our forward CP. Corps orders all our division around and tells them what to do and how to do it, leaving Ward out of the picture."<sup>83</sup> Referring to the same incident several



days later, he writes, “General [Ward] is in low spirits because of Corps, and I don’t blame him.”<sup>84</sup>

Hatfield’s diary also provides some insight regarding the results of Fredendall’s direction to Ward about the defense of Djebels Ksaira and Lessouda. We were attacked on the 16<sup>th</sup> by 100 German tanks, infantry, and plenty of AT guns. Combat A took the brunt of the attack, and the one medium tank battalion with them was wiped out. Corps then said we could have back Col Alger’s Bn of medium tanks and ordered us to use Col Stack’s force with Alger and wipe out German tanks in the vicinity of Sidi bou Zid. General [Ward] protested but to no avail so we attacked next day and, as a result, Alger’s Bn was wiped out, and we lost many other guns and vehicles. Meanwhile, we had a Bn of infantry trapped on Djebel Lessouda, and Col Drake had 1,500 men trapped on Djebel Ksaira.<sup>85</sup>

Hatfield’s growing contempt for orders from II Corps is evident in a later entry, as he wrote, “Corps then ordered down Combat B under Gen Robinett from Maktar to feed to the lions, but Gen Ward refused to do it. Combat B was placed on the right flank and remnants of Combat A and C reorganized for a withdrawal the next day.”<sup>86</sup>

**Centralized Control from Miles Away.** Another aspect of Fredendall’s leadership style that had a negative impact on operations in the Kasserine area was his tendency to centralize his command while he was miles away from the front lines. To maintain contact with front-line forces, commanders typically try to establish their headquarters near existing lines of communication, with robust communications facilities and close enough to the combat units to enable convenient visits. Fredendall’s headquarters was distant from the front and far up a canyon, well removed from lines of communication. In constructing the headquarters bunker, Fredendall had employed nearly 200 engineers for more than 3 weeks on this project, which was later abandoned, unfinished, under the German threat at Kasserine.<sup>87</sup> The common GI could not miss the fact that Fredendall was very far-removed from the activity.

At the front, American vulnerability was obvious to the lowest ranking private soldiers, even if their senior commanders were too remote to grasp the situation. Soldiers possess a marvelous ability to reduce events to their simplest common denominator. And so it was in Tunisia, with an unnamed GI’s pithy observation that, “Never were so few commanded by so many from so far away”!<sup>88</sup>

By the time of Kasserine, Fredendall’s corps headquarters was located nearly 65 miles from the front in a huge underground bunker concealed in a gorge. Soldiers in the corps disparagingly referred to the headquarters as “Lloyd’s very last resort” or “Shangri-la, a million miles from nowhere.”<sup>89</sup> As discussed above, Harmon’s after-action report on Kasserine identified Fredendall as unfit for command, and Eisenhower belatedly dismissed Fredendall of his command of II Corps.<sup>90</sup>

## Lessons Learned

The failure at Kasserine Pass proved to be a temporary tactical setback for the American and Allied forces. Despite the various operational failings

## Battle of the Kasserine Pass: Examining Allied Operational Failings

*Fredendall provided precise instructions to Ward on the deployment of troops to defend Djebels Ksaira and Lessouda, covering subjects such as proper employment of patrols, the importance of aerial photography, and the function of artillery, among other topics.*

---

## Battle of the Kasserine Pass: Examining Allied Operational Failings

*The Americans learned much from their failures in this campaign—lessons that would be carried over to the ensuing campaigns in Sicily, Italy, and northern France.*

on the part of the Allies, particularly the Americans, Axis forces were unable to make any strategic gains from their victories over the period 14-21 February. Ultimately, the Americans learned much from their failures in this campaign—lessons that would be carried over to the ensuing campaigns in Sicily, Italy, and northern France.

One such lesson was the importance of an efficient logistics and supply line. By March 1943, the Allies had drastically improved the logistics flow in North Africa. To remedy the problem with a shortage of transportation, more than 4,500 2-1/2-ton trucks were delivered from the United States. The influx of trucks for transportation improved the flow of food, fuel, ammunition, and weapons to the front. Several brief diary entries from Hatfield reveal how improved logistics affected the troops at the front. Writing on 8 March 1943, Hatfield says, “After lunch, I drove a new M-5 tank, with twin engines. It runs very smoothly and quietly and is very easy to shift.”<sup>91</sup> Again referring to the flood of new weaponry, he writes, “This will help us complete refitting the 2<sup>d</sup> Bn of the 1<sup>st</sup> AD and allow the TD crews to become familiar with their 37 new 75-mm guns.”<sup>92</sup> In addition to greater availability of transport, roads and railways were improved and repaired to facilitate the delivery of supplies and personnel to the front in Tunisia as Allied forces pressed their offensive to the east.<sup>93</sup>

A second valuable lesson for the Americans was the importance of competent combat leadership. Throughout the Tunisian campaign, Eisenhower had been alarmed at the Americans’ inability to apply their training to the existing battle conditions, and he was appalled by numerous examples of poor discipline.<sup>94</sup> He realized the role of commanders to instill the necessary discipline among the troops and also the importance of ensuring combat forces received proper training and equipment. A commander such as Fredendall, who spent his time some 65 miles away from his forces, could not ensure the combat troops were battle-ready and disciplined.

As previously mentioned, Fredendall did not champion the ideals of centralized control and decentralized execution, as he failed to entrust subordinate commanders with the necessary initiative and authority to act on their own. In his many diary entries, Hatfield captures several instances of the distrust between Fredendall and Ward. Writing on 25 February 1943, Hatfield states, “Gen Fredendall asked for Gen Ward’s relief about 2 weeks ago, but Gen Eisenhower said no. Gen Ward is going to get out from under Fredendall and the sooner the better.”<sup>95</sup> Despite Fredendall’s misgivings, however, “Gen Harmon, CG of 2<sup>d</sup> AD, ... came down to see Gen Ward this morning. He says Gen Ward is very solid with high command.”<sup>96</sup> Eisenhower and AFHQ were well-aware of the situation regarding Fredendall and, although acting somewhat belatedly, worked to remedy the situation. Hatfield again provides a clear picture of these events.

There was quite a meeting of generals, including Gen Eisenhower, Gen Fredendall, Gen Bradley, Gen Eddie (9<sup>th</sup> Inf Div), Gen Allen (1<sup>st</sup> Inf Div), and Gen Ward. The meeting was successful for Gen Ward. He told me that he

---

no longer has to worry about a knife in his back and is tops with high command.... We now have a new corps commander, Gen George S. Patton. Fredendall returns to the States.<sup>97</sup>

## Battle of the Kasserine Pass: Examining Allied Operational Failings

Competent commanders were needed to lead American forces and instill an aggressive spirit in the force.<sup>98</sup>

Although not discussed above, numerous other aspects of the Tunisian campaign, as well as the experiences of the Battle of Kasserine Pass, were applied by US military and political leaders to improve the conduct of the war. These included the need to improve equipment such as tanks and antitank weapons to counter the Wehrmacht's forces. With respect to the improved equipment, Hatfield wrote, "We have a battalion of TD (776<sup>th</sup>) attached to us who are equipped with the new M-10 guns (75-mm on the M-3 tank chassis). The Germans will be quite surprised."<sup>99</sup> Beyond the need for improved equipment, Eisenhower recommended that training be improved for forces entering the military to better prepare units for the rigors of combat as they had experienced in North Africa. Additionally, the Americans realized the need to improve the coordination between air and ground forces in a combined arms warfare concept. Again, Hatfield's diaries encapsulate these changes as they were occurring. On 5 March 1943, he wrote, "We had lunch with the Air Corps and then went to Bou Chekba to a meeting of our officers. Col Howze was conducting a tactical walk and discussion on the ground east of Bou Chekba. It was very interesting and instructive."<sup>100</sup> Hatfield wrote further on 7 March, "Gen Patton and Gen Bradley came down after lunch. We all went to the tactical walk on the combined arms, near Bou Chekba."<sup>101</sup> The coming offensive drive to the Tunisian seaboard would show greatly improved integration of ground and air forces. In due course, all these lessons and changes were incorporated and played a role in the eventual Allied victory in Europe.

*Fredendall did not champion the ideals of centralized control and decentralized execution, as he failed to entrust subordinate commanders with the necessary initiative and authority to act on their own.*

### Summary

The Army's performance at the various engagements of the Battle of Kasserine Pass clearly illustrates the effect of operational-level decisions on the conduct of tactical operations. At Kasserine, US and Allied forces were plagued by a poor, slowly emerging logistics system. The shortcomings of the logistics system produced shortages of equipment and personnel and, ultimately, had an effect on the deployment of forces on the front lines. In addition to logistics, the poor employment of forces on the Tunisian front resulted from decisions made by field commanders—decisions that resulted in forces being thinly dispersed and poorly massed for operations. Additionally, the Americans and Allies were guilty of ignoring the principles of unity of command or effort and security. Petty personal conflicts among leaders compounded the already difficult issue of unifying forces in a coalition environment. Likewise, overreliance on a single source of intelligence impaired the Allies' ability to apply the principle of security, as it allowed the Axis forces to gain an advantage over the Allied forces. Finally, failures of leadership at higher levels of

## Battle of the Kasserine Pass: Examining Allied Operational Failings

*The Americans and Allies  
were guilty of ignoring the  
principles of unity of  
command or effort and  
security.*

command further complicated issues for the Allies in the engagements around Kasserine. Despite the problems, the Allies, particularly the Americans, learned from the mistakes of the Tunisian campaign and were able to apply these lessons to the prosecution of the remainder of the war in the European theater.

### Notes

1. Rick Atkinson, *An Army at Dawn: The War in North Africa, 1942-1943*, Vol 1, *The Liberation Trilogy*, New York: Henry Holt and Company, 2002, 17.
2. Martin Blumenson, *Heroes Never Die: Warriors and Warfare in World War II*, New York: Cooper Square Press, 2001, 425.
3. Blumenson, *Heroes Never Die*, 317.
4. Martin Blumenson, *Kasserine Pass*, Boston: Houghton Mifflin Company, 1966, 3-4.
5. Charles R. Anderson, *The US Army Campaigns of World War II: Tunisia*, World War II Commemorative Campaign Brochures, Army Center of Military History [Online] Available: <http://www.army.mil/cmh-pg/brochures/tunisia/tunisia.htm>, 1 Mar 03.
6. John Keegan, *The Second World War*, New York: Penguin Books, 1990, 340.
7. Williamson Murray and Allan R. Millett, *A War to Be Won: Fighting the Second World War*, Cambridge, Massachusetts: The Belknap Press of Harvard University Press, 2000, 272.
8. Carlo D'Este, *World War II in the Mediterranean, 1942-1945*, Chapel Hill: Algonquin Books, 1990, 1.
9. Murray and Millett, 273.
10. Norman Gelb, *Desperate Venture: The Story of Operation Torch, The Allied Invasion of North Africa*, New York: William Morrow and Company, Inc, 1992, 104-105.
11. David Rolf, *The Bloody Road to Tunis: Destruction of the Axis Forces in North Africa: November 1942-May 1943*, Mechanicsburg, Pennsylvania: Stackpole Books, 2001, 15-16.
12. *Ibid.*
13. D'Este, *World War II in the Mediterranean*, 6.
14. Blumenson, *Kasserine Pass*, 31.
15. Blumenson, *Kasserine Pass*, 27.
16. Blumenson, *Heroes Never Die*, 426.
17. Blumenson, *Kasserine Pass*, 31.
18. *Ibid.*
19. Atkinson, 176.
20. Blumenson, *Kasserine Pass*, 31.
21. Blumenson, *Kasserine Pass*, 73.
22. Anderson.
23. Blumenson, *Kasserine Pass*, 73.
24. Blumenson, *Kasserine Pass*, 73-74.
25. Anderson.
26. *Ibid.*
27. Ernest C Hatfield, personal diary, 14 Feb 43.
28. Anderson.
29. Carlo D'Este, *Patton: A Genius for War*, New York: Harper Collins, 1995, 458.
30. Ernest C Hatfield, personal diary, 15 Feb 43.
31. Anderson.
32. *Ibid.*
33. *Ibid.*
34. Maurice Matloff, ed, *American Military History*, Vol 2, 1902-1996, Conshocken, Pennsylvania: Combined Books, 1996, 135.
35. D'Este, *Patton*, 458.
36. D'Este, *World War II in the Mediterranean*, 8-9.

37. Atkinson, 171.
38. D'Este, *World War II in the Mediterranean*, 6.
39. Hatfield, personal diary, 7 Jan 43.
40. Hatfield, personal diary, 8 Jan 43.
41. D'Este, *World War II in the Mediterranean*, 9.
42. D'Este, *World War II in the Mediterranean*, 15.
43. D'Este, *Patton*, 457.
44. D'Este, *World War II in the Mediterranean*, 18.
45. D'Este, *World War II in the Mediterranean*, 15.
46. Department of the Army, Field Manual (FM) 3-0, *Operations*, Washington: Headquarters, Department of the Army, Jun 01, 4-13.
47. D'Este, *Patton*, 457.
48. D'Este, *Patton*, 457-458.
49. Hatfield, personal diary, 16 Feb 43.
50. Atkinson, 343.
51. *FM 3-0*, 4-14.
52. *Ibid.*
53. Blumenson, *Heroes Never Die*, 320.
54. *Ibid.*
55. Blumenson, *Kasserine Pass*, 88.
56. Blumenson, *Kasserine Pass*, 88-89.
57. *Ibid.*
58. Hatfield, personal diary, 13 Feb 43.
59. Blumenson, *Kasserine Pass*, 90.
60. Blumenson, *Kasserine Pass*, 89.
61. Blumenson, *Kasserine Pass*, 90.
62. Blumenson, *Kasserine Pass*, 90-91.
63. Blumenson, *Heroes Never Die*, 321.
64. *FM 3-0*, 4-14.
65. Blumenson, *Heroes Never Die*, 318.
66. D'Este, *World War II in the Mediterranean*, 17.
67. Gelb, 301.
68. Rolf, *The Bloody Road to Tunis*, 121.
69. Gelb, 301-302.
70. Rolf, *The Bloody Road to Tunis*, 127.
71. Rolf, *The Bloody Road to Tunis*, 121.
72. Orr Kelly, *Meeting the Fox: The Allied Invasion of Africa, from Operation Torch to Kasserine Pass to Victory in Tunisia*, New York: John Wiley and Sons, Inc, 2002, 174-175.
73. Gelb, 302.
74. D'Este, *Patton*, 459.
75. Rolf, *The Bloody Road to Tunis*, 9.
76. D'Este, *World War II in the Mediterranean*, 24.
77. Stephen E. Ambrose, *Eisenhower: Soldier and President*, New York: Touchstone Books, 1990, 87-89.
78. D'Este, *Patton*, 456.
79. Anderson.
80. D'Este, *Patton*, 459.
81. Blumenson, *Heroes Never Die*, 319.
82. Blumenson, *Kasserine Pass*, 121-122.
83. Hatfield, personal diary, 9 Feb 43.
84. Hatfield, personal diary, 11 Feb 43.
85. Hatfield, personal diary, 16 Feb 43.
86. *Ibid.*
87. Blumenson, *Kasserine Pass*, 86.



---

## Battle of the Kasserine Pass: Examining Allied Operational Failings

88. D'Este, *Patton*, 457.
89. D'Este, *Patton*, 459.
90. D'Este, *Patton*, 460.
91. Hatfield, personal diary, 8 Mar 43.
92. Hatfield, personal diary, 13 Mar 43.
93. Blumenson, *Kasserine Pass*, 304.
94. Rolf, *The Bloody Road to Tunis*, 84.
95. Hatfield, personal diary, 25 Feb 43.
96. Hatfield, personal diary, 27 Feb 43.
97. Hatfield, personal diary, 5-6 Mar 43.
98. Blumenson, *Kasserine Pass*, 307.
99. Hatfield, Personal diary, 14 Mar 43.
100. Hatfield, Personal diary, 5 Mar 43.
101. Hatfield, Personal diary, 7 Mar 43.

## General Carl A. Spaatz

Spaatz was born 28 June 1891 in Boyertown, Pennsylvania. He was commissioned in the Infantry after graduating from West Point in 1914. He served in Hawaii for a year as the white officer in charge of an infantry regiment of black soldiers. He began his flying at the Army Air Service Flying School at North Island, California, in November 1915. He reportedly soloed after his first 50 minutes of instruction. His first assignment after graduation was with the 1st Aero Squadron helping to try to chase down *Pancho Villa* in along the Mexican border in 1916. When the United States entered the war against Germany in 1917, his time in Mexico proved to be a valuable experience.



In France, he built up the flying program with 32 different types of aircraft, including 17 different models of the French Nieuport pursuit plane. He wanted practical combat experience before the war ended and attached himself to the 13<sup>th</sup> Aero Squadron, flying French Spads at the front for 2 weeks where he was credited with shooting down two German Fokkers in September 1918. When the Air Service organized the Transcontinental Reliability Endurance Flight in October 1919, Spaatz won it, flying west to east in a Curtiss SE-5. In 1921, he became commander of the 1<sup>st</sup> Pursuit Group at Kelly Field, San Antonio, Texas, the only pursuit unit in the Air Service at the time. This was followed by duty with units at Ellington Field, Texas, and Selfridge Field, Michigan. He graduated from the Air Service Tactical School at Langley Field, Virginia, where pursuit aviation was emphasized.

In January 1941, he was appointed chief of the Air Force Combat Command. Later that year, he returned to England to begin planning the American air effort in Europe. During the war, he was commander of the Eighth Air Force and later commander of US Army Air Forces in Europe. He went to North Africa to reorganize the Allied air forces, becoming commander of the Allied Northwest African Air Forces. He also commanded the Twelfth Air Force, which took part in both the North Africa and Sicily campaigns. In January 1944, he became commander of the Strategic Air Force in Europe, with responsibility for all deep bombing missions against the German homeland. When the war in Europe ended, he took command of Strategic Air Force in the Pacific. The atomic bombing of Hiroshima and Nagasaki took place under his command.

He succeeded Arnold as Commander in Chief of the Army Air Forces and became the first Chief of Staff of the Air Force in September 1947. He held that post until retiring in July 1948 in the rank of general. He served subsequently as chairman of the Civil Air Patrol and, for a time, contributed a column to *Newsweek* magazine. Spaatz died 14 July 1974.

[Online] Available: <http://www.airpower.maxwell.af.mil/airchronicles/cc/biograph.html>; <http://www.spaatz.org/gen/spaatzbio.html>; and <http://www.af.mil/bios/bio.asp?bioid=7210>.

**Major Kenneth M. Lang, USAF**

**The future of warfare requires policy makers and military leaders to assess advancements in military technologies in light of moral principles and *just war* theory. To the extent that precision-guided missiles and other technological revolutions provide significant advantages on the battlefield, the United States and other nations in possession of these technologies should understand the moral implications associated with their employment.**

# **Advanced Military Technologies**

## **Morality of Modern Warfare**

### **Introduction**

**I**n 1991, during the first Persian Gulf War, the world witnessed the first large-scale employment of advanced military technologies, including stealth aircraft and precision-strike weapons, by the United States and coalition partners in defense of Kuwait against the country of Iraq. Officially termed Operation Desert Storm by the allies, the results of these offensive surgical strikes were nothing short of breathtaking. At the forefront of these strikes was the use of precision-guided munitions (PGM) or *smart bombs*, able to find and hit their targets with precision accuracy from distances up to 15 miles away, producing devastating effects on enemy military centers of gravity, including leadership, infrastructure, and other essential military targets. These technologies invariably gave the United States and its coalition partners a tremendous advantage over enemy forces, resulting in the allies' ability to pick and choose specific targets at will for destruction or incapacitation, generating the maximum operational effect with the potential for minimum collateral damage.



## Advanced Military Technologies: Morality of Modern Warfare



*Our military must be ready to fight on all levels and all terms or conditions.*

Despite the emergence of these technologies and their refinement over the last decade, the employment of these capabilities raises serious moral issues by those mandating a type of *just warfare*. Specifically, do advanced military technologies contribute to fighting a more moral war? Second, what should the rules be for using advanced military technologies in fighting modern wars? Last, and perhaps the most important question, are those countries in possession of advanced military technologies obligated to fight on the *moral high ground*? On the surface, the answers to these questions might seem intuitively obvious. For example, some consider the relevance of traditional *just war* principles the product of a bygone age of Napoleonic warfare. These rules, they contend, unnecessarily restrict a nation's ability to wage total war and inhibit decisive victory. These people contend that war should be free from constraints that unfairly bind the behavior and conduct of parties engaging in warfare. However, in sharp contrast, these questions remain poignant and germane to others concerned with the inherent morality of modern warfare.

This ongoing debate strikes at the very heart of *just war* theory and the principles of morality that advocate putting restraints on the conduct of war. While extreme liberalism might contend that all wars are reckless and inherently immoral, this article speaks to those of us who embrace a realist perspective—that war in some form will always exist with the morality of modern warfare manifesting itself through the intentions and conduct by which men wage war. To this extent, what is considered moral in modern warfare is greatly impacted by the emergence of advanced military technologies that have the potential to dramatically change the nature of war.

The use of advanced military technologies and precision-strike weapons is a highly relevant topic deserving our full attention. Undoubtedly, the proliferation of these technologies will exponentially increase in the years ahead, forcing policy makers and moral philosophers to address these issues in an attempt to lay the foundation of a new age of morality in modern warfare.

### The Changing Nature of Warfare

*The acme of skill is not winning a hundred victories in a hundred battles, but to subdue the armies of the enemy without fighting.*

—Sun Tzu

Throughout the history of warfare, the debut of military technologies produced changes in battlefield tactics, changing the nature of war and necessitating a review of the morality of warfare. From the emergence of gunpowder to the advent of the flying machine, warfare adjusted its principles of morality based on the capabilities of combatants to wage war.

US literary critic John Mason Brown states:



Every modern war, however fortunate its outcome for us, has changed the world by subtracting from it abidingly. Every modern war has had to represent, in order to be won, a temporary abdication of ethical and humane standards. Every modern war has, in other words, demanded a certain retreat even of its victors and meant that they have lost in the very process of winning.<sup>1</sup>

In other words, the nature of modern warfare rests solidly on the means to achieve the desired objectives, with its conduct and moral principles a summary of lessons learned.

The changing means to achieve military objectives is readily seen with the emergence of advanced military technologies and their asymmetrical advantage on the battlefield. Specifically, possession of these technologies creates an advantage over the use of conventional military forces for two distinct reasons. First, precision technologies allow for the waging of war on a smaller, more economical scale. Second, precision weapons minimize damage to noncombatants and limit the amount of collateral damage to property. Both reasons are increasingly important to waging a *just war* and contribute to the credibility of deterrence.

While the effects of precision weapons on deterrence are yet unknown, the lesson learned is simple: our military must be ready to fight on all levels and all terms or conditions. This enduring principle remains our greatest focus in an effort to persuade our enemies that the costs of militarily engaging the United States would far exceed any expected benefits. For example, US maintenance of large-scale conventional forces might deter North Korea from a massive invasion against South Korea but might fail to deter small-scale aggression from guerrilla fighters in South America or terrorist bombings in Afghanistan. To this extent, deterrence is dynamic and must respond to the changing technological landscape.

## **The Emergence of Airpower and Moral Constraints**

Over the last 200 years, advancements in military technologies spawned an increase in battlefield lethality and the rise of total war. Over the last 100 years, early air campaigns contributed to this dynamic. During this time, air attacks killed scores of civilian noncombatants. However, while both combatant and noncombatant deaths from air attacks are estimated at 2 million, they pale in comparison to the more than 100 million people who died during 20<sup>th</sup> century warfare, most of these noncombatants.<sup>2</sup> Deaths from indiscriminate airpower also pale in comparison to the more than 750,000 German civilians who died as a direct result of the Allied starvation blockade during World War I.<sup>3</sup> Statistically, traditional measures like blockades, embargoes, and sanctions often result in a much greater loss of life than indiscriminate airpower. “Traditional forms of war are far more deadly—especially to noncombatants—than modern air war.”<sup>4</sup>

With the emergence of airpower as a dominant and decisive force during World War II, the rules for what was considered moral conduct during

## **Advanced Military Technologies: Morality of Modern Warfare**

Introduction .....	142
The Changing Nature of Warfare .....	144
The Emergence of Airpower and Moral Constraints .....	145
Operation Desert Storm .....	146
Operation Allied Force .....	147
Operation Enduring Freedom and Beyond .....	148
Morality and Just War Theory .....	149
The Rise of Precision Technologies .....	150
Application to Thesis .....	152
Personal Reflections .....	153
Conclusion .....	153

---

## Advanced Military Technologies: Morality of Modern Warfare

*At no time in history have precision weapons allowed their possessor the ability to differentiate between civilian and military targets of necessity in an attempt to limit or minimize the number of noncombatant casualties.*

war were increasingly contested. For example, Army Air Corps Lieutenant Colonel “Jimmy” Doolittle’s fire-bombing raids on Tokyo and the atomic bombing of the Japanese cities of Hiroshima and Nagasaki led to much debate and consternation on the morality of bombing noncombatants and what constituted acceptable collateral damage. Professor J. Zbryan Heiehir of the Harvard Divinity School in Cambridge concurs: “World War II was clearly a violation of the basic Christian and ethical principles of the use of force.”<sup>5</sup> In later years, issues of morality and *just* conduct were also debated during the US involvement in Korea and Vietnam where military objectives often were constrained by the latest military technologies. One example is the mass carpet-bombing of Vietnamese ground forces during Operations Linebacker I and II that killed scores of civilians. Instances like these conjure up horrific images of indiscriminate attacks on a nation’s populace, resulting in charges of war crimes and immoral conduct.

Despite these examples and the initial emergence of airpower as an indiscriminate attack force, sharp advances in emerging technologies and precision weapons over the last 10 years have literally revolutionized the air and space campaign. Such technological innovations include precision-strike weapons that have the demonstrated potential to alter significantly the conduct of warfare and battlespace operations by providing a tremendous advantage in the accuracy of missiles and bombs. At no time in history have precision weapons allowed their possessor the ability to differentiate between civilian and military targets of necessity in an attempt to limit or minimize the number of noncombatant casualties. Colonel Phillip S. Meilinger, former professor of aerospace power at Air University, supports this paradigm, stating, “Recent technological advances in weaponry and intelligence have significantly reduced casualties among both attackers and attacked.”<sup>6</sup> However, with the emergence of these technologies and increased reliance by those who use them, most notably the United States, comes increasing pressure from world leaders and international organizations toward those in possession of them concerning the employment of these technologies.

### Operation Desert Storm

By 1991, during the Persian Gulf war, the changing nature of warfare because of emerging technologies was readily apparent. The goal was to achieve US and coalition military objectives by disabling the Iraqi society, being careful to minimize injury to noncombatants and key Iraqi infrastructure. These attacks were accomplished by using conventional technologies and, more notably, precision-strike weapons and other advanced military and commercial technologies—the latter in an effort to conduct parallel warfare across the spectrum of military operations. The ability of US and allied forces to literally direct *surgical strikes* and avoid or minimize noncombatant casualties because of moral and political concerns was critically important and immediately began shaping the way we approached issues of collateral damage and casualties. Major Roger Hunter—deputy chief of Strategy, Plans, and Operations, Headquarters

Air Force—states, “Proportionate response and deliberate damage limitation—two important principles of the international law of war—are becoming more important as technology apparently increases capabilities.”<sup>7</sup> This concern by allied forces was evident and unprecedented as planners took great care to avoid the direct targeting of noncombatant civilians. For example, when Sadaam Hussein placed military equipment near holy places, the United States was forced to rethink its bombing campaign strategy in an effort not to fracture tenuous allied-Arab relations. General Norman H. Schwarzkopf, the allied force commander, would later comment, “We’re being very, very careful, in our directions of attacks, to avoid damage of any kind to civilian installations.”<sup>8</sup> Senior allied senior military officers also agreed, stating, “The worst civilian suffering has resulted, not from bombs that went astray, but from precision-guided weapons that hit exactly where they were aimed—at electrical plants, oil refineries, and transportation networks.”<sup>9</sup>

Despite allied attempts to avoid mistakes, one tragedy happened on 13 February 1991 when a US stealth fighter-bomber disintegrated the Amiriya bomb shelter in Baghdad killing some 600 to 1,000 civilians. Hunter describes:

... the bombing of the camouflaged Al Firdos command bunker during Desert Storm and the errant impact of a Tomahawk cruise missile into Baghdad’s Al Rashid Hotel 2 years later during an attack on Iraq’s Zaafaraniyah industrial complex (that) raised concerns around the world over the regrettable deaths of civilians in these incidents.<sup>10</sup>

As a result of these conventional and precision-weapon strikes, at least 170,000 children younger than 5 years old died in 1992 because of the delayed effects of the bombings, impacting electrical powerplants, water treatment, and fuel and transportation links, leading to malnutrition, cholera, and typhoid.<sup>11</sup> Organizations like Greenpeace were quick to comment on the morality of bombing in the Persian Gulf by pointing to its latent effects on noncombatant civilians.

## Operation Allied Force

Similar to the war in the Persian Gulf, North Atlantic Treaty Organization (NATO) commanders went to unprecedented lengths to avoid civilian casualties and excessive collateral damage. During the Balkans and Kosovo wars, the US air campaign and bombing strategy again raised moral issues. One example was NATO use of *smart bombs* during attacks on Belgrade where at least three missiles struck local TV and radio stations on the top floors of civilian business centers.<sup>12</sup>

A second example occurred 14 April 1999 near Djakovica when an enemy target was identified incorrectly, killing 73 civilians. In this example, NATO pilots, traveling at more than 15,000 feet, incorrectly identified a hostile target because of a lack of coordination between the pilots and NATO intelligence sources, destroying the target with PGMs. Despite this tragedy, it should be noted that the weapons struck their

*During the Balkans and Kosovo wars, US air campaign and bombing strategy again raised moral issues.*

---

## Advanced Military Technologies: Morality of Modern Warfare

*Despite US increased reliance on advanced military technologies over the last 12 years, the question remains, does US reliance on these weapons contribute to fighting a more moral war?*

intended targets. Critics further charged that the act of using precision-guided weapons was immoral, primarily because NATO pilots' reliance on these technologies allowed them to fly out of range of enemy surface-to-air missiles and hostile antiaircraft fire. This asymmetrical advantage of allied pilots was labeled as cowardly, unfair, and immoral. Nonetheless, while NATO pilots could have flown at lower altitudes, the PGM effects would not have improved. Rather, the maximum accuracy of these weapons is gained by dropping the bomb in a mid-altitude range—that is, 15,000 to 23,000 feet—to allow for in-flight course correction and maximum accuracy.<sup>13</sup>

Despite the critics' charges, it should be remembered that it remains the commanders' imperative not to endanger the lives of their pilots. Empirically, the unaccounted for risks posed to noncombatant civilians by NATO precision-strike weapons delivered at high-altitude flight were minimal, assuming accurate targeting data.

### Operation Enduring Freedom and Beyond

After the tragic events of 11 September 2001, more than 90 percent of the ordnance dropped during Operation Enduring Freedom in Afghanistan was precision-guided, compared to only 10 percent during Operation Desert Storm.<sup>14</sup> However, similar to the Kosovo war, accidents continued to happen. One example occurred when the United States mistakenly strafed a wedding party when the Israeli Air Force dropped a 1-ton bomb in a civilian neighborhood, killing the targeted victim and nine innocent children. In this example, failure was measured by disproportionality and excessive collateral damage and not the failure of the precision-strike weapons to achieve the target objectives. Still, while not entirely faultless, precision munitions have advanced to the point where target accuracy is nearing 100 percent.

Despite increased reliance on advanced military technologies by the United States over the last 12 years, the question remains, does US reliance on these weapons contribute to fighting a more moral war? Specifically, do these technologies actually minimize the number of noncombatant casualties and lower the incidence of collateral damage? While it is shown that the nature of warfare has changed because of advanced military technologies, it also can be shown that the propensity of precision-strike weapons increasingly allows for *cleaner* wars with lower collateral damage to noncombatants.

However, despite the fewer number of potential casualties, critics charge that these same technologies are actually counterproductive in that their possession increases the likelihood of going to war. Dr Albert Pierce, director of the Center for the Study of Professional Military Ethics at the United States Naval Academy, describes this dynamic: "Standoff precision weapons give you the option to lower costs and risks, but you might be tempted to do things that you might otherwise not do."<sup>15</sup> It is precisely because of the increasing *cleanliness of war* that some opponents contend that precision-strike weapons actually increase the risk of war. For

example, critics cite the most recent buildup of allied forces in the Persian Gulf as credibility for this argument, stating that President George W. Bush's *rush to war* demonstrates his capability and willingness to use the capability of precision-strike weapons, despite securing United Nations support and international approval. In addition, overreliance on advanced technologies may lead commanders to think surgical strikes, aimed only at targets of military necessity, are inherently moral as they avoid civilian casualties. "This lessening of the threshold of what areas can be targeted has created the unfortunate outcome of militaries' using weapons in situations that are highly populated by civilians. In both the Oruzgan and Gaza Strip examples, the military commanders believed their weapons would hit only the military target. In both cases, they were wrong."<sup>16</sup>

In examining what is considered moral and just, traditional theorists remain committed to endorsing the two major moral principles of proportionality and discrimination. However, when balancing these principles with the use of advanced military technologies, such as precision-strike weapons, it quickly becomes apparent that proportionality and discrimination should be weighed against the reality of war and what is considered acceptable collateral damage, including the suffering of noncombatants. The elder President Bush, at the onset of the first Persian Gulf war, sensed he could not justify going to war simply to protect the interests of oil. Rather, he contended, "Such a war would have to be fought from higher moral ground, and Iraqi injustices inside Kuwait became the *just cause* for US military action."<sup>17</sup> It can be demonstrated that most of the bombing and allied actions during Operation Desert Storm "met ethical and legal criteria of action, the few exceptions—those cases in which standards were violated either by accident or by intention—do not provide grounds for major criticism of the war effort."<sup>18</sup> Simply stated, what might be judged as legal might not be viewed as moral.

To better understand the moral implications of using advanced military technologies in the age of modern warfare and the rules for fighting these wars, the foundations of *just war* theory must be examined.

## Morality and Just War Theory

The theory of *just war* dates back approximately 1,500 years to the great Christian thinker Saint Augustine of Hippo and other secular philosophers. At that time, the growing number and increasing lethality of wars prompted Saint Augustine to ask two poignant questions, formulating the basis of *just war* theory. First, "When is it justified to declare a war?" Second, when war is declared, "What limits should be placed on combat?" Despite the conviction of some Christians and pacifists who believed war is never justified under any conditions, Saint Augustine's ideas that some wars were justified under certain conditions—when the cause supported some higher ideal or convention—appealed to many oppressed people. However, as Saint Augustine argued, justification in going to war was not enough. Rather, morality and Christian prudence dictated that, even after hostile engagements ensued, the respect of Christian rights inherent among all

*What limits should be placed  
on combat?*



---

## Advanced Military Technologies: Morality of Modern Warfare

*Right intention is the assurance that force must be in accordance with just cause and not territorial aggrandizement, intimidation, or coercion.*

men must further guide the conduct of those engaged in warfare. One significant capstone principle evolving from this reasoning was that soldiers and statesmen must discriminate between combatants and noncombatants and not deliberately target noncombatants in the process of waging war. In codifying this and other principles, Saint Augustine, and later the great Christian philosopher Saint Thomas Aquinas, formulated two distinct components of *just war* theory: *jus ad bellum* and *jus in bello*. Each of these criteria is fully documented by James Johnson in *Morality and Contemporary Warfare*.

*Jus ad bellum* outlines seven criteria defining the right to resort to force. First, *just cause* includes the protection and preservation of those things of value. Second, *right authority* must lie with the duly authorized representative of a sovereign political entity. Third, *right intention* is the assurance that force must be in accordance with *just cause* and not territorial aggrandizement, intimidation, or coercion. Fourth, the *overall good* achieved by the use of force must be greater than the harm done. Fifth, war must be considered a *last resort* in that all other means to achieve the justified ends must be exhausted. Sixth, there must be a *reasonable hope* of success in the outcome of war. Seventh and last, the *aim of peace* must be the establishment of international stability, security, and peaceful interaction.

In contrast, *jus in bello* stipulates the conduct or behavior in applying force after the decision to go to war is made. These criteria include proportionality and discrimination. First, proportionality means to avoid gratuitous or otherwise unnecessary harm (for example, torture) beyond that necessary to achieve the stated objectives. Examples include limiting some types of weapons, avoiding particular days of fighting, and identifying those persons who should fight (that is, combatants). The second principle of *jus in bello*, discrimination, attempts to avoid direct, intentional harm to noncombatants and afford them certain protections. This class of people often includes members of the clergy, merchants, peasants on the land, and other people in activities not related to the direct prosecution of the war. The latter principle protects those classes of citizens specifically designated by international laws or treaties.

For purposes of this article, more weight is given to examining the principle of *jus in bello* and the moral impact of precision munitions in light of proportionality and discrimination. This approach is consistent with modern theorists who must define and consider what constitutes acceptable collateral damage suffered by civilian noncombatants and property as a result of advanced military technologies.

### The Rise of Precision Technologies

*Weapons should be selected based on their ability to influence an adversary's capability and will.*

—Air Force Manual 1-1, 1992

In 1925, Brigadier General “Billy” Mitchell argued, “Airplanes could defeat an enemy by soaring over his defensive perimeter and striking directly at his economic and military core.”<sup>19</sup> More than 75 years later, this concept was unequivocally validated by the use of precision-strike weapons and their inherent ability to disable enemy centers of gravity during Operation Desert Storm.

In popular military circles, the term disabling systems denotes a class of instruments “intended to disable personnel and equipment while avoiding killing personnel or doing catastrophic physical damage to equipment.”<sup>20</sup> While this class of disabling systems is much more restrictive today, the concept of disabling weapons is not new. During the Vietnam war, F-4G *Wild Weasel* aircraft destroyed enemy radars by using high-speed antiradiation missiles. The idea behind disabling systems was to produce a desired effect and significantly enhance a particular dimension of military operations without resorting to the use of conventional military force. More than 30 years later, disabling systems were given a tremendous boost and enhanced credibility with the emergence of precision smart weapons that are incredibly accurate, limiting collateral damage to innocent life and property through the use of sophisticated guidance systems.<sup>21</sup>

During the Persian Gulf war, allied forces flew 215 sorties against electrical plants, using laser-guided GBU-10 *smart bombs* and Tomahawk cruise missiles with precision target accuracy.<sup>22</sup> Over the last decade, the accuracy of these precision-strike weapons has improved exponentially. For example, during Operation Desert Storm, approximately 90 percent of laser-guided precision munitions hit their targets.<sup>23</sup> Launched from the air, these weapons have adjustable fins that allow them to alter their flight pattern and zero in on targets. “PGMs have several different types of guidance systems—laser homing, inertial, optical, or infrared imaging, or satellite signals from the Global Positioning System (GPS).”<sup>24</sup>

However, though incredibly accurate, targeting success is not always guaranteed. Problems with *smart technology* guidance systems or environmental conditions mean that accidents do happen occasionally and that the risks to noncombatants and property increase. Since the Persian Gulf war, the number of PGM navigational errors continues to diminish. The failure of precision-strike guidance systems or software errors has and can lead to accidents by destroying civilian targets and producing noncombatant casualties, resulting in charges of immoral conduct.

While these disabling systems provide a robust and increasingly effective means to achieve surgical precision on the battlefield, the use of advanced military technologies does not guarantee a successful military campaign or public endorsement on the morality of using these weapons. To this extent, a balance must occur between the use of these technologies and the expected outcome. Zero or near-zero tolerance of error in the use of precision weapons to ensure a moral precipice is unrealistic and cannot be supported historically or in the age of modern warfare. This was directly observed during US military involvement in Grenada, Panama, and the Persian Gulf. “The American public now expects such low losses. Even a few casualties are unacceptable.”<sup>25</sup>

*In popular military circles, the term disabling systems denotes a class of instruments “intended to disable personnel and equipment while avoiding killing personnel or doing catastrophic physical damage to equipment.*

---

## Advanced Military Technologies: Morality of Modern Warfare

*No longer is it acceptable for the United States to inflict mass casualties on civilian populations and indiscriminate damage if it has the capabilities and means to achieve its objectives with minimum loss of life and property.*

However, military commanders and those who employ advanced military technologies are increasingly obligated to assume the moral high ground. “We can no longer afford to miss. More than that, even when we hit the target, we have to do so almost softly and with minimal impact...that is our new standard.”<sup>26</sup> As advanced military technologies proliferate and reshape the nature of modern warfare, the moral bar of accountability is also raised to new, unprecedented heights as battlefield commanders have more options regarding proportionality and discrimination. “So called smart bombs or precision-guided munitions have given commanders far more leeway than they had with the conventional bombs of World War II.”<sup>27</sup> As a result, new moral dilemmas are precipitated.

### Application to Thesis

Examining the evolution of smart weapons against the backdrop of modern warfare, it seems relatively easy to conclude that military and commercial technological revolutions, as they relate to the production and use of weapons, will continually change the nature of warfare and the moral environment. To the extent that a nation or country possesses these advanced military technologies, it is obligated to subscribe to the *moral high ground* and use them in a manner consistent with the principles of *just war* theory. No longer is it acceptable for the United States to inflict mass casualties on civilian populations and indiscriminate damage if it has the capabilities and means to achieve its objectives with minimum loss of life and property. To this extent, military planners increasingly will rely on the use of precision technologies and disabling systems to conduct parallel warfare. The objectives of modern warfare will be to incapacitate enemy leadership and a nation’s ability to wage war, not as a punishment on society as a whole but for moral, political, and economic purposes that best contribute to postwar stability and reconstruction efforts.

To this extent, the United States increasingly will be held to a much higher standard than those nations who do not possess such technologies. For example, in the case of a war against Iraq, I would not expect Sadaam Hussein to subscribe to the moral *high ground*, simply because he lacks the technological means to achieve his objectives. Rather, we might well expect him and others like him to use those military means at their immediate disposal—regardless of the moral implications. These means may or may not include chemical and biological weapons or other weapons of mass destruction, but as history proves in similar cases, the demonstrated conduct of those nations that do not possess advanced military technologies most likely will not reflect the principles of *just war* theory, especially the *jus in bello* concepts of proportionality and discrimination. The rationale is an attempt to asymmetrically level the playing field against superior military forces. As a resort, these nations most likely will not be held to as high a standard as the United States and other nations that possess advanced military technologies. Indeed, for

these nations and individuals fighting for survival and self-interests, the *moral high ground* will be pursued only as long as it is convenient and does not conflict with stated objectives.

As the nature of modern warfare continues to evolve, perhaps the greatest application of *jus in bello* and morality is not the weapon itself or its ability to minimize harm to noncombatants but the level of restraint needed to avoid destroying particular targets deemed not critical to the overall warfighting effort or accomplishment of objectives. These future targets may or may not include hostile power-production plants, crude oil, or sanitation zones.

## Personal Reflections

My observations support the direct correlation between possession and use of precision weapons and principles of morality. I would hope that the United States, as the sole remaining superpower and primary caretaker of the world's democracies, will continue to accept a greater responsibility for the weapons it entrusts to the military. I do not agree with those who charge that the United States and its coalition partners should purposely put our pilots in harms way by demanding they fly at lower levels when it can be statistically shown that precision weapons are most effective when released at higher altitudes, minimizing collateral damage and fulfilling the principles of *just war* theory. However, if history provides any realistic benchmark, there always will be loss of life to noncombatants and higher than expected collateral damage to property.

I also disagree with critics who assume a *zero defect* policy associated with the use of precision-strike weapons. No weapon is ever proven 100 percent accurate. Additionally, it should be understood that nations at war have and will always assume some level of risk and responsibility in association with armed conflict.

*It should be understood that nations at war have and will always assume some level of risk and responsibility in association with armed conflict.*

## Conclusion

The future of warfare requires policy makers and military leaders to assess advancements in military technologies in light of moral principles and *just war* theory. To the extent that precision-guided missiles and other technological revolutions provide significant advantages on the battlefield, the United States and other nations in possession of these technologies should understand the moral implications associated with their employment. The possession and use of these weapons increasingly requires moral accountability and constraints, specifically in adherence with the *jus in bello* principles of proportionality and discrimination to guard against careless use.

While the use of traditional, nondiscriminatory weapons in combination with advanced military technologies is still necessary to achieving military objectives, the combination of each type or class of weapon facilitates the concept of parallel warfare, creating a level of synergism that fosters deterrence across the entire spectrum of political and military operations. While the days of indiscriminate bombing may

---

## Advanced Military Technologies: Morality of Modern Warfare

be coming to a close on some levels for the United States and for other nations that use precision-strike technologies, it is also important to realize that many nations are technologically constrained and will continue to promote their interests and objectives by adhering to a lower form of morality in warfare. While this might not seem fair on the surface, it does prove that those who choose to fight will be judged according to their ability to wage *just war*.

### Notes

1. John Mason Brown, "Seeing Things," *Saturday Review*, 12 Aug 50, 1.
2. Phillip S. Meilinger, "A Matter of Precision," *Foreign Policy*, Mar/Apr 01, or Phillip S. Meilinger, "Precision Aerospace Power, Discrimination and the Future of War," *Aerospace Power Journal*, Fall 2001, 5.
3. Meilinger, 6.
4. Meilinger, 5.
5. Laurent Belsie, "How War has Evolved Since World War II," 2 Sep 99 [Online] Available: <http://csmweb2.emcweb.com/durable/1999/09/02/pls2.htm>, 14 Jan 03.
6. Meilinger, 1.
7. Robert C. Hunter, "Disabling Systems and the Air Force," *Aerospace Power Journal*, Fall 1994, 3.
8. George Lopez, "The Gulf War: Not So Clean," report by the Bulletin of the Atomic Scientists, Sep 91, Vol 47, no 7 [Online] Available: <http://www.bullatombsci.org/issues/1991/s91/s911lopez.html>, 15 Jan 03, 2.
9. Barton, Gellman, "Allied Air War Struck Broadly in Iraq: Officials Acknowledge Strategy Went Beyond Purely Military Targets," *The Washington Post*, 23 Jun 91, A-1.
10. Hunter, 2.
11. Gellman, 2.
12. Belsie, 3.
13. Meilinger, 2.
14. Robert S. Dudley, "McPeak on the War," *Air Force Magazine*, Vol 74, No 5, May 91 [Online] Available: [http://www.afa.org/magazine/perspectives/desert\\_storm/0591watch.html](http://www.afa.org/magazine/perspectives/desert_storm/0591watch.html), 13 Jan 03, 10.
15. Belsie, 1.
16. Tony Lang, "Civilians and War: Dilemmas in Law and Morality," report by the Carnegie Council on Ethics and International Affairs, Aug 02 [Online] Available: <http://www.carnegiecouncil.org/about/lang2.html>, 14 Jan 03, 4.
17. Lopez, 2.
18. Lopez, 3.
19. William Mitchell, *Winged Defense: The Development and Possibilities of Modern Air Power—Economic and Military, 1925*, 3.
20. Hunter, 1.
21. *Ibid.*
22. Gellman, 4.
23. *Ibid.*
24. Meilinger, 1.
25. Meilinger, 4.
26. *Ibid.*
27. Belsie, 2.



---

## General James H. Doolittle

**D**oolittle was born 14 December 1896 in Alameda, California. In October 1917, he enlisted in the Army Reserve. Assigned to the Signal Corps, he served as a flying instructor during World War I. He was commissioned a first lieutenant in the Air Service, Regular Army in July 1920, and became deeply involved in the development of military aviation. On 24 September 1922, he made the first transcontinental flight in under 24 hours. He was sent by the Army to the Massachusetts Institute of Technology for advanced engineering studies. Assigned to test-facility stations, he spent 5 more years in diverse phases of aviation, winning a number of trophy races, demonstrating aircraft in South America and, in September 1929, making the first successful test of blind, instrument-controlled landing techniques. He left the Army but continued to race, winning the Harmon trophy in 1930 and the Bendix in 1931 and setting a world speed record in 1932. He served on various government and military consultative boards during this period.



He returned to active duty as a major with the Army Air Corps shortly before US entry into World War II. After a tour of industrial plants that were converting to war production, he joined Army Air Corps headquarters for an extended period of planning that bore spectacular results on 18 April 1942 from the deck of the carrier *Hornet*. Doolittle led a flight of 16 B-25 bombers on a daring raid over Japan, hitting targets in Tokyo, Yokohama, and other cities, scoring a moral huge victory.

The Japanese High Command was so alarmed by America's ability to strike at its homeland they attempted to expand the perimeter of activity in the central and southern Pacific, with disastrous results. From January 1944 to September 1945, he directed intensive strategic bombing of Germany. In 1945, when air operations ended in the European theater, he moved with the Eighth Air Force to Okinawa in the Pacific. After the war, he returned to reserve status and civilian life. He served on the National Advisory Committee for Aeronautics from 1948 to 1958, the Air Force Science Advisory Board, and the President's Science Advisory Committee. He retired from both the Reserves and civilian life in 1959, but remained active in the aerospace industry. He continued to serve on a great many advisory boards and committees on aerospace, intelligence, and national security. Doolittle died 17 September 1993.

[Online] Available: <http://www.airpower.maxwell.af.mil/airchronicles/cc/biograph.html> an<http://www.af.mil/bios/bio.asp?bioID=5249d>.

---

Major Thomas D. Eisenhower, USAF

Leadership and command of the Nexters is a challenge for Baby Boomers and Xers. Baby Boomers do not want to let go of the reins; Xers just now are finding their footing in a world that once overlooked them, while Nexters are technically capable of hitting the ground running in any capacity within a company or the military ranks. Followership will not be a problem for the Nexters, and they will not shrink from taking command when it is their turn. But retention of superb leaders throughout the younger Xer and the new Nexter ranks will be the toughest leadership challenge of Baby Boomers and older Xers.

# 21<sup>st</sup> Century Leadership

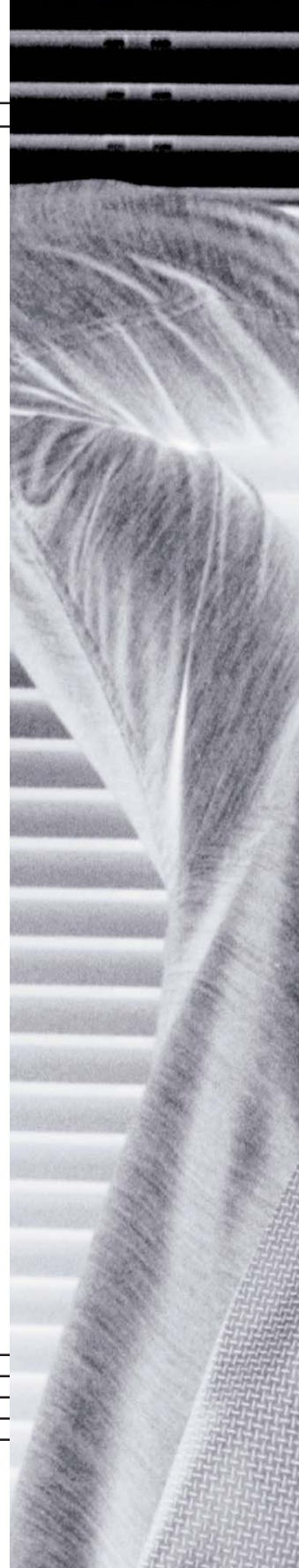
## Leading the “Nexters” Generation

### New Recruits and Leadership

*The existence of a following, whether it be a ship, an air station, or a fabrication shop, compels leaders to act responsibly. A leader only occupies that position by consent—he is responsible first, last, and always to those who follow him—it is a way of life!*<sup>1</sup>

—Rear Admiral Donald R. Eaton, USN

The United States, as well as its military, has been shaped over the last 60 years by two easily identifiable generations, the Veterans and Baby Boomers. In *Generations at Work: Managing the Clash of Veterans, Boomers, Xers, and Nexters in Your Workplace*, the authors discuss the importance of understanding each new generation’s core values and work ethics as developed from key seminal events that shaped their formative years.<sup>2</sup> This understanding







## 21<sup>st</sup> Century Leadership: Leading the “Nexters” Generation



*Advances in communications, sensor to shooter interfaces, and precision weapons have blurred the lines of strategic, operational, and tactical levels of war.*

forms the foundation from which leaders of today’s military will recruit, train, inspire, and retain quality leaders for tomorrow’s Armed Forces.

The pace of technological change continues to increase exponentially as the new millennium begins for the Armed Forces. Advances in communications, sensor to shooter interfaces, and precision weapons have blurred the lines of strategic, operational, and tactical levels of war. Just as the tools of the military profession have changed, the latest generation of military professionals has changed. Enlisted recruits and newly commissioned officers bring to the fight values, morals, and beliefs gleaned from the environment of their childhood, educational system, parental influence, and spiritual development. Veterans, Baby Boomers, and Generation Xers are tasked with leading and mentoring the newest generation—known as Generation Y, the Nexters, or the Digital Generation—of military professionals entering the ranks. Who are Veterans, Boomers, Xers, and Nexters?

In *Generations at Work*, the authors use a slightly different chronological description of which age groups the Veterans, Baby Boomers, and Xers belong to than other research publications. The authors interviewed a number of people in each generational category and determined that Veterans born between 1922 and 1943 had more in common with each other than the conventional grouping of those born between 1922 and 1946.<sup>3</sup> Baby Boomers born between 1943 and 1960 had more in common with each other than the conventional grouping of those born between 1946 and 1965. Xers are defined as those people born between 1960 and 1980, as opposed to 1965 and 1980, again due to common espoused core values. Finally, Nexters were born from 1980 to 2000. This article adopts the generation schema introduced in *Generations at Work*. Not all persons in a generation possess the characteristics described or act in the same way.<sup>4</sup> Presented are trends generally found in persons from the generation being discussed.

The Veteran generation is composed of 52 million people, born before and during the depression and World War II.<sup>5</sup> Their earliest memories and influences are strongly associated with sacrifice, duty, and honor. The Baby Boomers boast 73.2 million people.<sup>6</sup> Raised after World War II in a time of opportunity and progress, their childhoods are filled with fond memories of moon landings and tragic memories of assassinations and Vietnam. Generation Xers are 70.1 million strong and sometimes referred to as the *lost* or *invisible* generation.<sup>7</sup> Watergate and the Three Mile Island nuclear reactor incident led to disenchantment and a fierce opposition to reliance on the government. This generation became even more self-reliant with the explosion of the personal computer (PC). The Nexters are entering the workplace with 69.7 million people and a passion for technology and much greater optimism than Xers.<sup>8</sup> Each of these four generations is tough, intelligent, and highly capable. Successful military leaders have always tailored their leadership style to the needs of the subsequent generation and will do so again with the Nexters. Still, why should a leader be interested in understanding what makes a Nexter tick? Why should leaders want or need to earn the respect of their subordinates?

Lieutenant Hal Goetsch, US Navy, wrote an article, published in the October 1995 edition of *Proceedings* by the US Naval Institute, to address the retention problems of submariners from a submariner's perspective. "Junior officers are bored and unchallenged because they are not instilled with a sense of purpose—and that major problem will not go away with an extra [\$17,000]<sup>9</sup> a year. A sense of purpose is developed and comes from the top of an organization."<sup>10</sup> He is talking about leadership all the way up the chain of command. He also is talking about retention of key mid-level personnel. There is a connection between leadership and retention. Each of the services struggles with retention problems of noncommissioned officers (NCO) and junior officers. An all-volunteer military cannot afford to allow a high percentage of trained professionals to exit the ranks just when their country needs them to lead its military.

Eaton understands that challenges facing a modern military senior leader are the same as challenges we all struggle with as NCOs and officers in the profession of arms. Leaders earn the respect of those under their command. Each new recruiting cycle brings tens of thousands of new recruits into the Armed Forces. Young airmen, marines, soldiers, and sailors are volunteers who meet or exceed demanding entrance requirements. They are well-educated and often possess technological skills beyond many of their superiors. New recruits increasingly must know not just *which* job must be done but *why* it must be done and for *what* ultimate purpose. These recruits have high expectations and are confident they can make more money easily in the civilian world. They did not join the military to put food on the table or a roof over their family. They joined the military to earn money for college and for adventure, discipline, and leadership opportunities.<sup>11</sup> Quality of life is important, but so is a sense of purpose.<sup>12</sup>

Leading the latest generation entering the ranks of the Armed Forces should be of paramount concern to military and civilian leaders at all levels. A military leader has three responsibilities to the next generation. First, a leader must train personnel through education, practical experience, and mentoring. Technical training courses, professional military education (PME), and higher education are vital to developing military professionals. Experience is gained only by learning the ropes on the job. Mentoring completes the training package by providing feedback and guidance from the leader to subordinates. The second responsibility a leader must provide each and every subordinate is a sense of purpose. We have smart people. Give them an honorable vision and the support and resources to accomplish the mission. Third, retention is a key issue today. A leader must retain quality people to maintain and grow a quality force. A leader who successfully accomplishes the first two responsibilities and is successful at procuring and providing decent resources will succeed in building and retaining a high-quality military force.

This article sheds light on a combination of generational core values and leadership tools necessary for a 21<sup>st</sup> century leader. It is intended to

# 21st Century Leadership: Leading the "Nexters" Generation

New Recruits and Leadership .....	156
World War II and the Draft: Veterans and Baby Boomers .....	160
All-Volunteer Military: Xers and Nexters .....	164
Challenges to Leading the Nexters .....	167
Crisis?...or Opportunity! .....	171
Commanding Nexters and Beyond .....	176



---

## 21<sup>st</sup> Century Leadership: Leading the “Nexters” Generation

*The Great Depression, World War II, the atomic bomb, the Iron Curtain, the Berlin Airlift, Korea, and Sputnik are events that shaped a critical era within the Armed Forces.*

initiate thought on the part of the reader as to what skills and tools are required to successfully lead airmen, sailors, soldiers, and marines. It does not and cannot determine the exact recipe for success, but it will provide military leaders a foundation from which they may learn to exploit and win the clash of generations in the Armed Forces.

### World War II and the Draft: Veterans and Baby Boomers

*Leadership is inseparable from the followers’ needs and goals. If that concept is ignored, the organization becomes factionalized, progress is halted, and productivity is impossible. Leaders in any organization are essentially politicians who must deal with the realities of pressures from above and below. In the hierarchy of leadership, no one is exempt. Admirals, commodores, captains, department heads and ship supervisors operate in an environment of conflicting political pressures. It might be said that leadership is the art of the possible.<sup>13</sup>*

—Rear Admiral Donald R. Eaton, USN

### Seminal Events

David Fromkin’s *In the Time of the Americans* traces international politics of the 20<sup>th</sup> century and the coherent generation in America who defined it. They are the Veterans who came of age and began taking the reins to shape their world in the 1940s, 1950s, and 1960s. They see events from a common point of view because of their shared experiences.<sup>14</sup> Many tragic national and international events, as well as unprecedented accomplishments in technology, impacted their formative years. The Great Depression, World War II, the atomic bomb, the Iron Curtain, the Berlin Airlift, Korea, and Sputnik are events that shaped a critical era within the Armed Forces. Veterans guided the nation as it entered the world stage as one of two world superpowers.

While Veterans were steadfastly guiding the country through its infancy as a world superpower, Baby Boomers were born and came of age with visions of America at its best and, at times, its worst. For many Baby Boomers, the McCarthy hearings in Congress with J. Edgar Hoover’s all-powerful Federal Bureau of Investigation *rooting* out the Communist element within our society are contrasted with a *My Three Sons* lifestyle and space flight.

The nuclear age, National Aeronautics and Space Administration, civil rights, the arms race, the Cuban missile crisis, mutual assured destruction, and Vietnam convinced Baby Boomer military leaders that total war was not only unthinkable but also unacceptable.<sup>16</sup> These military leaders guided us through a minefield of doomsday scenarios and pulled us back from the edge of the cliff. Table 1 portrays a snapshot of key events that shaped Veterans and Baby Boomers.

**Core Values**

Free loving Baby Boomers always have been compared against the noble Veteran generation whose sacrifices and triumphs have earned them great respect and deep admiration. Veteran core values are easily traced to the seminal events of their lives and are compared to the core values of Baby Boomers in Table 2. The core values that Veterans hold dear reflect their perception of nobility and “a dedication to service, to something greater than making a living.”<sup>17</sup> Baby Boomers inherited a strong commitment to public service from the Veteran generation but did not feel obligated to serve in the military.<sup>18</sup> “Yet many of the crusades of Baby Boomers, with all their self-righteous nuttiness, resulted in solid achievements and advancement in areas such as civil rights, the environment, and women’s status....”<sup>19</sup>

It is key to remember that not all people defined by birth year as a Veteran or Baby Boomer espouse the core values attributed to their

Veterans		Baby Boomers	
1927	Lindbergh completes first transatlantic flight	1954	McCarthy HCUAA hearings began.
1929	Stock market crashes	1955	Rosa Parks refuses to sit at back of bus in Montgomery, Alabama.
1932	Franklin D. Roosevelt elected President	1957	First nuclear powerplant.
1933	New Deal	1957	Congress passes the Civil Rights Act.
1939	Hitler invades Poland	1960	Birth control pills introduced.
1940	Battle of Britain	1962	Cuban missile crisis.
1941	Pearl Harbor; US enters WW II	1962	John Glenn orbits the earth.
1944	D-day in Normandy	1963	President Kennedy assassinated.
1945	Victory in Europe and Japan	1965	United States sends ground troops to Vietnam.
1948	Berlin Airlift	1966	National Organization for Women founded.
1950	Korea	1968	Martin Luther King and Robert F. Kennedy assassinated.
		1969	First lunar landing.
		1969	Woodstock.
		1970	Kent State University shootings.

*Baby Boomers inherited a strong commitment to public service from the Veteran generation but did not feel obligated to serve in the military.*

Table 1. Seminal Events for the Veteran and Baby Boomer Generations<sup>15</sup>

21<sup>st</sup> Century Leadership:  
Leading the “Nexters”  
Generation

Veterans	Baby Boomers
Dedication/Sacrifice	Optimism
Law and Order	Team Orientation
Delayed Reward	Personal Gratification
Hard Work	Health and Wellness
Respect for Authority	Personal Growth
Patience	Youth
Conformity	Work
Duty before Pleasure	Involvement
Adherence to rules	
Honor	

Table 2. Core Values of Veterans and Baby Boomers<sup>20</sup>

*Veterans lived through national and international crises that threatened their fundamental needs.*

generation, and not all live up to them. Nor should the reader assume that a Veteran cannot be an optimist or that a Baby Boomer is always seeking personal gratification over being honorable. It does imply that there is a definite difference in the average Veteran and the average Baby Boomer. The sharp contrast in core values represents the seminal events that impacted their collective lives, amplified by an increase in global communications and television broadcasts around the country and the world in particular.

**Heroes**

Every generation has its heroes. Veterans lived through national and international crises that threatened their fundamental needs. President Franklin D. Roosevelt displayed incredible leadership to pull a nation through the Great Depression, initiate the New Deal, show stoic resolve following Pearl Harbor, and provide steadfast world leadership in World War II. Fittingly, Veterans identify with men tested on the field of battle, sports icons, national leaders, and Superman (Table 3).<sup>21</sup> Military legends such as General George C. Marshall; General Dwight D. Eisenhower; Admiral William F. Halsey, Jr; and General Douglas MacArthur provided Veterans with noble goals, a clear path, and unwavering efforts toward eradicating fascism and rebuilding Germany and Japan.

The world became even smaller through exponential advances in transcontinental aviation, trade, and communications. The United Nations grew out of the ashes of the League of Nations as the international governing body dedicated to providing a worldwide forum for international law, trade, and security. Liberalism enjoyed a Renaissance of unprecedented proportions as numerous enlightened events took place. Colonies of former empires sought and achieved independence. True advances in civil rights of all peoples were made and codified in law. The women’s liberation movement broke many barriers in many cultures. And incredible technological developments sent men to the moon and returned them safely to the earth. Baby Boomers who joined the military did so with great shoes to fill and high expectations. Selfless and visionary, they

got their taste of battle in and over the jungles of Vietnam.<sup>22</sup> Lessons learned from this painful chapter of American history were indelibly imprinted on their souls, as well as a disillusioned population at home.

Baby Boomers gravitate toward heroes whose accomplishments transcend international politics and national security.<sup>24</sup> Jacqueline Kennedy; Dr Martin Luther King, Jr; and Gandhi are included as heroes by the average Baby Boomer.<sup>25</sup> Diversity, idealism, and an optimistic vision about the future of the United States and the world permeate this generation. They notably ignore President Lyndon B. Johnson, General William C. Westmoreland, and Jane Fonda.

**Work Ethic**

Seminal events, core values, and heroes of the Veterans and Baby Boomers provide us a foundation for comparison of these two key generations. But how do they function and react in the workplace, under pressure, and in combat?

Veterans entered the workforce in the 1940s, 1950s, and 1960s. The average company divided the labor between executives and employees and had a clear organizational hierarchy.<sup>26</sup> Nearly every company maintained military-style relationships whereby most people were formally referred to as Mr or Mrs Doe. Regardless of their social, economic, or cultural roots, this generation has a very consistent work ethic. The average Veteran is very stable, detailed, thorough, loyal, and hard-working.<sup>27</sup> The Veteran’s work ethic was mostly seen as strength; however, it sometimes was seen as a liability. For instance, ambiguity and change are difficult for Veterans to cope with. They were reluctant to go against the grain, were uncomfortable with conflict, and did not speak their minds when they disagreed.<sup>28</sup>

The Baby Boomers’ work ethic reflects their core values as well; however, they are more complicated. As a group, they are driven, service-oriented, and willing to go the extra mile even if that means working to exhaustion. They are good at relationships, want to please, and are good

*The Baby Boomers’ work ethic reflects their core values as well; however, they are more complicated.*

Veterans	Baby Boomers
Superman	Gandhi
Franklin D. Roosevelt	Martin Luther King, Jr
MacArthur, Patton, Montgomery, Halsey, and Eisenhower	John and Jacqueline Kennedy
Winston Churchill	John Glenn
Audie Murphy	
Babe Ruth	
Joe Foss	
Joe DiMaggio	

Table 3. Heroes of Veterans and Baby Boomers<sup>23</sup>

---

## 21<sup>st</sup> Century Leadership: Leading the “Nexters” Generation

*Generation Xers only now are beginning to exert their leadership influence within the military ranks and society.*

teamplayers. On the downside, they are uncomfortable with conflict, reluctant to go against peers, govern by consensus to the point of gridlock, and are not naturally *budget minded*. Baby Boomers do not receive feedback well, harshly judge those who see things differently, and are self-centered.<sup>29</sup> Baby Boomers are strikingly different from Veterans when it comes to the workplace, but those differences can be traced directly to the context of their formative years.

### All-Volunteer Military: Xers and Nexters

*Because people are better informed, the leader of today is more likely to deal with subordinates who resent being treated as subordinates, who may be critical of any organizational system, who expect to be consulted and to influence their own destinies, and who often stand on the brink of alienation from the very institution that depends on their loyalty and commitment.<sup>30</sup>*

—Rear Admiral Donald R. Eaton, USN

### Seminal Events

Generation Xers only now are beginning to exert their leadership influence within the military ranks and society. They have been referred to as the *lost* or *invisible* generation while growing up in the shadows of the Baby Boomers. Xers quietly have observed events such as Vietnam, Watergate, and the Jonestown suicides (Table 4). These events are very emotionally significant to 20<sup>th</sup> century Baby Boomer liberals. They evoke stoic acceptance by Veteran realists. Xers are a generation that “no one ever really noticed, that didn’t exactly register, until recently. That quasi-invisibility, born of living in the long shadow of ‘The Boom,’ was but the lull before the storm of identity building.”<sup>31</sup> They witnessed the women’s liberation movement, modern terrorism, and the advent of computers. Xers lived through the post-Vietnam 1970s and the Reagan administration’s effort to rebuild our *hollow* forces, both in terms of equipment and spirit, into the powerhouse displayed later in Desert Storm.<sup>32</sup> The 1980s brought direct terrorist actions against the Marines, the Challenger disaster, the stock market minicrash, and the destruction of the Berlin Wall. World peace was declared by the Baby Boomers following the Gulf War and the dissolution of the Union of Soviet Socialist Republics in 1991. Close the history books. The Baby Boomers saved the planet. Xers can remain anonymous.

Xers had a different take on the status of world peace, and only in the 1990s has that view gradually been exerted. Generation X viewed the events of the 1970s, 1980s, and 1990s as an increasingly alarming wake-up call to America. We seemed to be a superpower that could be intimidated by any country that chose to stand up to us unconventionally.<sup>34</sup> North Vietnam, Iran, Cuba, North Korea, Central and Latin America, Serbia, and any one of a dozen Middle Eastern and North African countries routinely challenged our politics, economic policies, and morally superior attitude. Xers could remain anonymous no longer.



21<sup>st</sup> Century Leadership:  
Leading the “Nexters”  
Generation

	Xers		Nexters
1970	Women's Liberation protests.		Nexters are marked thus far more by trends than events.
1972	Palestinian terrorists kill 17 Israelis at Munich Olympics.		
1973	Watergate scandal.	Trends	Child focus.
1973	Energy crisis.		Technology.
1976	Tandy and Apple market PCs.		Busy, overplanned lives.
1978	Jonestown mass suicide of 900 (Jim Jones cult leader).		Stress.
1979	Three Mile Island nuclear reactor nears meltdown.		Violence.
1979	Iran takes 66 Americans hostage.		Clinton/Lewinsky.
1979	Desert One hostage rescue attempt ends in military disaster.	Events	
1980	John Lennon assassinated.		
1983	283 Marines killed by terrorists in Beirut, Lebanon.	1991	Gulf War.
1986	Space Shuttle Challenger disaster.	1991	Cold War ended and peace broke out over the world.
1987	Stock market plummets.	1993	Waco, Texas.
1988	Terrorists blow up Flight 103 over Lockerbie, Scotland.	1995	Oklahoma City bombing.
1989	Exxon Valdez oil tanker spill.	1999	Columbine school shootings.
1989	Berlin Wall torn down.	2001	9/11 terrorists attack by Usama Bin Laden's Al-Quaida network..
1991	Gulf War.		Ongoing war on terrorism.
1991	Soviet Union dissolves.		
1992	Rodney King beating videotaped; followed by Los Angeles riots.		

*Generation X viewed the events of the 1970s, 1980s, and 1990s as an increasingly alarming wake-up call to America.*

Table 4. Seminal Events for the Xer and Nexter Generations<sup>33</sup>

---

## 21<sup>st</sup> Century Leadership: Leading the “Nexters” Generation

*The truly interesting thing about Nexters and younger Xers is that they know more about the Internet than their bosses and, thus, are entering the workplace in a commanding position when it comes to digital technology.*

All the while, the Nexters have been growing up in families from both the Baby Boomer and X generations. More so than at any other time in history, older parents, single parents, nontraditional parents, and *daycare* parents are raising a generation bred on MTV, digital technology, and diversity.<sup>35</sup> Sex scandals, school shootings, homegrown and international terrorism, and the vast Internet are leading influences in their lives. Globalism permeates this generation.

### Core Values

Like prior generations, the core values of Xers and Nexters can be traced to seminal events, as well as parental guidance, cultural, and spiritual influences. Being the *invisible* generation, Xers learned to be self-reliant. This one core value permeates every facet of their lives, from relationships to the workplace. Xers are survivors and uninterested in extraneous material. Bullet background papers are the perfect written communication for them. Each of the other core values in Table 5 relates to being open to differing ideas and new technology. For instance, *think globally* implies an open mind to other cultures, religions, beliefs, and politics. *Technoliteracy* implies an understanding and appreciation for the digital technology explosion but not a consuming desire to master it, just exploit it. Fun is the core value that may keep this generation off Prozac and Viagra. Fun implies appropriate management of their home, work, and personal life that will keep this generation well grounded and balanced.<sup>36</sup>

Nexters seem to have core values of evolved Baby Boomers. Optimism, diversity, street smarts, and civic duty are extremely important to them.<sup>38</sup> The truly interesting thing about Nexters and younger Xers is that they know more about the Internet than their bosses and, thus, are entering the workplace in a commanding position when it comes to digital technology.<sup>39</sup> Parents are learning about technology from their kids. Another interesting turnaround is a commitment by many Xer and older Baby Boomer parents to their families. Many parents were disillusioned during their upbringing in two-career parent households. In *Generations*, Howe and Strauss state, “Not since the early 1900s have older generations moved so quickly to assert greater adult dominion over the world of childhood—and to implant civic virtue in a new crop of youngsters.”<sup>40</sup>

### Heroes

True to their reputation as a generation, Xers do not profess to have any heroes.<sup>41</sup> In a sense, maybe they are their own heroes since self-reliance dominates their core values. It can be argued that it is still too soon for such survivalists to settle upon a collective group of heroes. They are just exerting their influence in society and the military. In 20 to 30 years, they will have endured enough to be able to identify those whom they admire and respect. It takes time.

Nexters do not have or need time to decide whom they admire. A brief look at this group, and it is obvious that strength of character, not just individual accomplishment, is reflected in this diverse group of heroes. If the core values and heroes noted in Tables 5 and 6 are any indication, Nexters have a bright future.

## 21<sup>st</sup> Century Leadership: Leading the “Nexters” Generation

Xers	Nexters
Diversity	Optimism
Thinking Globally	Civic Duty
Balance	Confidence
Technoliteracy	Achievement
Fun	Sociability
Informality	Morality
Self-reliance	Street Smarts
Pragmatism	Diversity

**Table 5. Core Values of Xers and Nexters**

Xers	Nexters
None	Michael Jordan
	Princess Diana
	Mark McGuire and Sammy Sosa
	Mother Teresa
	Bill Gates
	Kerri Strugg
	Mia Hamm
	Tiger Woods
	Christopher Reeves

**Table 6. Heroes of the Xer and Nexter Generations<sup>42</sup>**

*Nexters are surprisingly realistic about their expectations in the workforce.*

### Work Ethic

Xers have a very simple work ethic. Give them meaningful projects in a nonmicromanaged work environment and get out of the way.<sup>43</sup> Xers are self-developing, quick studies and able to handle multiple tasks in a chaotic environment.<sup>44</sup> They react negatively to regulations and requirements that restrict them for no apparent reason. Mandatory means and methods for accomplishing the job only will cause them to question the competence of the leadership in a company or at the highest ranks in the military.

Nexters are surprisingly realistic about their expectations in the workforce.<sup>45</sup> They are optimistic about the future and possess many of the positive traits of Veterans, Baby Boomers, and Xers. “They combine the teamwork ethic of the Boomers with the can-do attitude of the Veterans and the technological savvy of the Xers.”<sup>46</sup> Nexters are very resilient and actually believe hard work and goal setting are vital to achieving what they want in life.<sup>47</sup>

### Challenges to Leading the Nexters

*Sociological conditions today have fostered individuals who are jealous of their rights and demand a fair share of rewards and*

---

## 21<sup>st</sup> Century Leadership: Leading the “Nexters” Generation

*The Armed Forces have benefited from the diverse roots and aptitude found in its recruits.*

*recognition. They demand to be treated as individuals, are skeptical of authority, and very aware that they are more qualified than ever.*<sup>48</sup>

—Rear Admiral Donald R. Eaton, USN

Corporate America, as well as the military, is well-aware that the population of the United States is quite unique. “America is often called a melting pot. ...[Some say] it is a salad. It is really more of a stew.”<sup>49</sup> Generations of immigrants from all over the world have sought a new life with increased opportunities here in America. Values and beliefs from literally hundreds of cultures have been—and continue to be—transplanted into communities around this nation. The Armed Forces have benefited from the diverse roots and aptitude found in its recruits. The educational level of the average enlisted and officer service member has dramatically increased.<sup>50</sup> Professional military education, an all-volunteer force, and decent pay and benefits have combined to make the Armed Forces arguably the best military in the world. Yet, the challenges of leading each new generation grow more complex. Cultural differences that add flavor to the stew inevitably collide with generational differences leading to conflicts and barriers in society, as well as the military. These conflicts and barriers are not insurmountable, but they do exist and must be addressed by leaders.

### **Cultural (Generational) Differences**

There are differences in the four generations that resemble cultural differences. In the first chapter of *The Origins of Cultural Differences and Their Impact on Management*, Jack Scarborough succinctly describes culture. Culture is “the set of values, attitudes, and beliefs shared by...a group, which sets the standards of behavior required for continued acceptance and successful participation in that group.”<sup>51</sup> We commonly think of culture in terms of nations or ethnic groups, but any cohesive group has a culture.<sup>52</sup> Groups as diverse as the Navy Seals, IBM, NRA, NOW, Trekkies, and computer geeks all have a culture that is passed on to newcomers from their predecessors. Veterans, Baby Boomers, Xers, and Nexters have a culture all their own. Given that any cohesive group has a culture, how can we determine key elements of the Nexters or other groups?

Edgar H. Schein analyzes culture at three levels: artifacts, espoused values, and basic underlying assumptions.<sup>53</sup> Artifacts are “phenomena that one sees, hears, and feels when one encounters a new group with an unfamiliar culture.”<sup>54</sup> Nexters and some Xers are entering the military with noserings, tattoos, and other visible artifacts that are easy to observe but difficult to figure out.<sup>55</sup> Espoused values are shared values or beliefs that ultimately become shared assumptions within the group.<sup>56</sup> The goals or philosophy of Nexters, thus, may be quite different from Xers, Baby Boomers, or Veterans, yet not outwardly identifiable. Finally, the deepest level of culture is composed of basic underlying assumptions that are simply realities to that culture.<sup>57</sup> Basic underlying assumptions are not even periodically reviewed or pondered. Determining these within the

Nexter generation is difficult at best but is the ultimate source of values and actions that drive Nexters and other cultures.<sup>58</sup>

The core values of Veterans, Baby Boomers, Xers, and Nexters identified in Tables 2 and 5 are values that social anthropologists generally use to identify a group or culture.<sup>59</sup> There is no requirement that all members of a group exemplify the core values of that group. They are values you can typically expect to find in members of a particular group or, in our case, generation. Core values motivate our actions, are reinforced from shared experiences, and are reflected in a culture’s religion, political power, economics, physical trappings or surroundings, leaders, heroes, legends, and myths.<sup>60</sup> Military leaders must recognize that the core values of Nexters, or any generation, are espoused values or even basic underlying assumptions within the Nexter culture. Influencing, let alone changing, core values is not practical. Recognizing and understanding Nexter core values is the answer. As noted in Table 5, Nexters espouse eight powerful core values that shrewd military leaders can capitalize on.

To further grasp the core values of Nexters, three dimensions that greatly affect Nexters, as well as the culture of the generations that lead them, are discussed. Having a purpose in life is one key core of value dimension.<sup>61</sup> Baby Boomers work 60 to 120 hour workweeks. Their purpose in life is to work. They *live to work*.<sup>62</sup> Conversely, Xers see no purpose with earned income sitting in the bank or tied up in investments while they have no time to enjoy the fruits of their labor. Xers *work to live* and seek jobs with reduced pay and hours but greater benefits and leave options.<sup>63</sup> In the military environment, this equates to cutting through to the heart of issues and disregarding the trappings. Tell them what they need to know and the objectives, give them the tools and resources, and get out of the way. Nexters are optimistic about the future and realistic about the present. “They combine the teamwork ethic of the Boomers with the can-do attitude of the Veterans and the technological savvy of the Xers.”<sup>64</sup> One study quoted in *Generations at Work*, titled Gen2001, showed that 85 percent of the Nexters surveyed had established goals for the next 5 years.<sup>65</sup> This indicates strong espoused values within the Nexter culture. Military leaders must provide this generation with an honorable sense of purpose. A second key core value dimension is the societal role. Some people prefer to work alone, maximize their individual wealth, and are highly competitive. Others work best when part of a team, look for win-win solutions, and contribute to group success. Knowing what motivates an individual provides the commander flexibility in determining how best to use subordinates. One key question military leaders should ask Nexters, as well as themselves, is do they feel more loyalty to their unit or to their personal interests?<sup>66</sup> The core values Xers espouse suggest they are more loyal to their personal interests. Nexter core values indicate they are more loyal to unit interests. A third key core value dimension has received much scrutiny throughout the 1990s. Are ethics absolute or situational? “Is the same conduct always right or wrong? Are there absolute moral principles by which all must abide, or must standards depend on the circumstances?”

*They combine the teamwork ethic of the Boomers with the can-do attitude of the Veterans and the technological savvy of the Xers.*



---

## 21<sup>st</sup> Century Leadership: Leading the “Nexters” Generation

*Ethnocentrism is a common  
fault of societies and  
cultures.*

More specifically, can my obligations to a particular person (or client) supersede my general or universal duties to society at large?”<sup>67</sup> These questions were tested to the limit in front of the entire nation during the 1990s and impacted at least three Presidential elections. Nowhere is this dimension more important than the deadly serious profession of arms. Nexters expect their commanders to be ethical and moral pillars or, at least, keep within certain well-established boundaries. Military leaders must review and reflect on their core values periodically to ensure they are providing the right vector to Nexters.

Now that the core values of Nexters are understood, it is important to note that the core values of military leaders will not always be the same as those of the followers. Ethnocentrism describes what happens when one culture tends to see itself as “normal and superior and the other aberrational and inferior.”<sup>68</sup> Twenty-first century leaders cannot afford to be ethnocentric. Ethnocentrism is a common fault of societies and cultures. Jack Scarborough quotes a study conducted by Geert Hofstede, where, with the 60 nations included in his study, the United States was the most individualistic.<sup>69</sup> Another researcher, Fons Trompenaars, found Americans very high “in universalist ethics, individualism, specificity in our separation of work from social discourse, achievement orientation, and in a sense of control over nature and our own destiny.”<sup>70</sup> Said another way, Americans are extremely ethnocentric—and for good reason. Ethnocentrism falls in the realm of espoused values and maybe even basic underlying assumptions. Baby Boomers, Xers, and Nexters have never known a world where the United States has not been a superpower. American exceptionalism is arguably a basic underlying assumption for most corporate and military leaders. Military leaders should guard against this assumption. They must also avoid being generationally ethnocentric when dealing with Nexters if they hope to gain their respect. Respect is something the follower bestows on the leader who earns it.

### **Conflicts and Barriers between Generations**

In addition to fundamental cultural dimensions, there are basic conflicts and barriers between generations within any given society. There are four areas of conflict that all generations must address to bridge the cultural and generational gap between Nexters and current military leadership. These four conflict areas were derived from systematic review of annotated texts in the bibliography and the personal experience of the author.

The first area is technical competency of the *new* generation versus experience of the *old*. Each generation is faced with the task of training its replacements in society and, in our case, the military. Oftentimes, we are not ready for the speed at which the newer generation wishes to take the reigns. Nexters already are more competent in digital technology than Xers, let alone Baby Boomers or Veterans.<sup>71</sup> Why should we not allow them to just cut in at the front of the line and take over now? They are not experienced and have not earned their stripes. These are common justifications for the older generation to delay transition to the newer generation. Military leaders must continually educate, train, and provide operational experience to Nexters.

Second and third, the ability to communicate and people skills are vital to breaking down barriers and resolving conflicts. In the military ranks, we have a legacy of being brutally direct in what we say, the content of communication. We must be as adept with our people skills in how we say it, the context of communication.<sup>72</sup> Xers appreciate the directness of the content but are turned off by poor or inappropriate delivery. Nexters are very sociable and adept at transmitting as well as receiving communications in a variety of technical methods. Video conferencing, digital recordings, and e-mail are all excellent to facilitate getting a commander’s message out. But two methods of communication must not be lost. The telephone or 15 minutes of one-on-one personal discussion lets subordinates, superiors, and peers know they are important. It is easy to provide feedback to a computer screen, but one-on-one is more effective. Nexters are more sensitive than Xers. People skills, which provide the context of communication, thus, are even more important for this latest generation. The greatest barrier to leadership is the lack of desire for the follower to receive information the leader is transmitting. Conversely, military leaders frequently must turn off their transmitters and concentrate on receiving communication from Nexters. How military leaders communicate with Nexters using their people skills is of vital importance.

Finally, the greatest bridge across generations and cultures is trust. Trust is difficult to gain and easy to lose. It must be earned through leadership by example, consistency, experience, competence, work ethic, and living up to noble core values. Nexters, just like all generations before, will look to those leaders who consistently meet their level of expectation. Goetsch’s article *Keeping the Generation X Junior Officer* is a classic example of shattered trust in military leadership.

*The military must maintain trust within itself, and so must military leaders maintain trust between themselves and the Nexter generation.*

*Junior officers are chosen less for their scholarship, cognitive ability, and leadership potential and more for their uncommonly high threshold of pain and their distinct ability to follow directions. That realization—not quality-of-life issues or recreant attitudes prior to entering the submarine force—is at the heart of the retention problem.<sup>73</sup>*

—Lieutenant Hal Goetsch, former US Navy officer

The military must maintain trust within itself, and so must military leaders maintain trust between themselves and the Nexter generation. “Retention, like quality, is free if top leadership fosters the right environment and cultivates its next generation.”<sup>74</sup> Sentiments such as those from Xer junior officers like Goetsch beg the question, is there a crisis between military leadership and the latest generation?

### **Crisis?...or Opportunity!**

*It follows then that authority is entitled only to the respect it earns and no more. With the stage thus set, leadership is a matter of eliciting cooperation, rather than commanding obedience. It is a matter of*

---

## 21<sup>st</sup> Century Leadership: Leading the “Nexters” Generation

*As Nexters come on the work scene and join the ranks of the Armed Forces, an age-old scenario will play out over the next 2 decades.*

*being mindful of the needs of people in the context of a common mission.<sup>75</sup>*

—Rear Admiral Donald R. Eaton, USN

So, is there a crisis with the entrance of the Nexters onto the work stage? It is beneficial to note the military is not alone in facing this issue. The commercial world also must struggle successfully with this leadership challenge, which is reflected in the following quote from *Generations at Work: Managing the Clash of Veterans, Boomers, Xers, and Nexters in Your Workplace*.

*Today’s American workforce is unique and singular. Never before has there been a workforce and workplace so diverse in so many ways. The mix of race, gender, ethnicity, and generation in today’s workplace is stunning.... There is a growing realization that the gulf of misunderstanding and resentment between older, not so old, and younger employees in the workplace is growing and problematic. It is a rift that will not heal itself or just go away, as so many organizations—those even aware of it—fervently hope. It is a problem based on economic, demographics, and worldviews that must be confronted to be solved.<sup>76</sup>*

—Ron Zemke, Claire Raines, and Bob Filipczak

### Crisis

As Nexters come on the work scene and join the ranks of the Armed Forces, an age-old scenario will play out over the next 2 decades. The military will lose its edge, rust, and fade away because of a loss of tradition, disrespect for authority, and no vision by the latest generation. This prediction is based on the ethnocentric view of the previous generation, and it has yet to happen in American society. But it could, could it not?

*Along with the guilt was nagging anxiety that the new generation might not be up to the task. “Many observers considered us a lost generation and feared we might collapse if summoned to some crucial battlefield,” recalled James Michener. Many veterans of World War I looked at the new cohort of American soldiers and feared they had been softened by the antiwar ideas of their overindulgent mothers during the 1930s. “Our men who had to do the fighting didn’t want to fight,” concluded one veteran war correspondent. “They had been told in the all-important first ten years and in their teens that it was not necessary to fight. Our men just wanted to go home.” The campaigns of 1942 and 1943 quickly erased these doubts. Indeed, by the end of the war, the GI had become a universal American symbol of courage and prowess.<sup>77</sup>*

—Ronald H. Spector

Nexters bring to the table their own vision of the world in which they want to live. Inevitably, this vision will be different from that envisioned

by Xers and definitely not the same as Baby Boomers. Service traditions, military traditions, customs and courtesies, and patriotism all come into question when a definable new generation takes the mantle. Spencer Johnson uses cheese as analogies for what we *have* and want to *keep*.<sup>78</sup> Boomers and Xers are in charge—they have cheese—and it makes them happy.<sup>79</sup> The cheese is very important to them, and they want to hold onto it.<sup>80</sup> In other words, their tendency is to hold onto power, not delegate authority. Their dilemma is that if they do not change they will quickly become extinct.<sup>81</sup> The power they are so desperately trying to hold onto will transfer anyway. Commanders who fear change—who want to hold onto their cheese for dear life—fall into the category of managers versus leaders. As Table 7 shows, what the followers of any new generation need are leaders more than managers. Military officers must train their replacements constantly for very practical reasons. They will either be promoted and pass on responsibility to a subordinate at a change of command, or they will be replaced and the mantle of responsibility transfers anyway to a subordinate at an assumption of command. Of course, if they do change, they will become extinct anyway, but the military, as an institution will be much better off for their wisdom and mentorship.

*Leaders are people who do the right thing. Managers are people who do things right.*<sup>83</sup>

—Warren G. Bennis

Respect, trust, and confidence in the commander are vital to any unit in today’s Armed Forces. New generations entering the ranks strike fear in some commanders who are convinced that respect for authority will become a thing of the past. Respect, trust, and confidence in authority are earned. In AU-2, *Guidelines for Command*, ten points of advice to commanders, as well as several additional tips, boil down to earning the respect of subordinates through consistent, concerted efforts.<sup>84</sup> During a crisis, it becomes quite evident who is a *leader* and who is a *manager*. Consistent, concerted leadership is critical in the profession of arms when chaos and crisis in the battlespace—or the Pentagon—rule.

### Opportunity

Opportunity is the side of the coin opposite crisis or chaos. Military managers avoid crisis and dynamic environments (Table 7), but leaders thrive and grow on ambiguity and conflict and even *failure*.<sup>85</sup> In the book *Rules & Tools for Leaders*, the author, Major General Perry M. Smith, describes a somber leadership experience where he was rewarded with a promotion:

*About a month after my promotion was announced, I asked the commander of all US Air Forces in Europe how I could possibly have been selected for promotion. The answer I got was fascinating; he replied, “Because you handled failure well.” When I told him that I didn’t understand what he meant, he told me that each wing*

*Respect, trust, and confidence in the commander are vital to any unit in today’s Armed Forces.*

21<sup>st</sup> Century Leadership:  
Leading the “Nexters”  
Generation

Managers	Leaders
Problem solvers	Analysts of purposes and causes
Statistics driven	Values driven
Seek conflict avoidance	Not only accept but invite conflict
Thrive on predictability	Thrive on ambiguity
Ensure organization objectives are achieved even if they disagree with them	Ensure their objectives and those of the organization become one and the same

Table 7. Trait Comparison Chart of Managers and Leaders<sup>82</sup>

*Cheap exercises using computer-simulated scenarios do not make up for exercises with real weapon systems and qualified personnel.*

*commander was failing in one way or another. One had a major drug problem on his base, another had flunked a major NATO [North Atlantic Treaty Organization] inspection, a third commander had a significant racial problem on his base, and yet another had a terrible ground-safety record. He then explained that he learns more of the character of leaders while they are dealing with failure than when they are succeeding.<sup>86</sup>*

—Major General Perry M. Smith, USAF, Retired

Military leaders need to know how to develop the full potential of Nexters and not fear their ascension in the ranks. The author feels strongly that, through research and experience, three key elements of leadership development in the military are critical to Xers and Baby Boomers as they attempt to lead Nexters. First, military leaders must provide a roadmap for the Nexters. Table 8 depicts a sample leadership roadmap developed by the author.

This roadmap allows Nexters to chart their own course, yet be guided by experienced military leaders. Second, acquiring and providing proper resources, to include money and manpower, is critical. The military does a fantastic job of accomplishing more with less. However, cheap exercises using computer-simulated scenarios do not make up for exercises with real weapon systems and qualified personnel. Finally, mentoring in the proper sense of the word is vital to military *leadership*. Mentoring military leaders seek out their troops on their home turf (shop, flight line, or office), find out what they are doing, spend time listening, and provide guidance when needed.<sup>88</sup> These three leadership elements augment a leader’s ability to seek out and cope with change. Managers are concerned with coping with complexity and finding solutions to complicated problems. A change in the environment or people creates more complexity and threatens a manager’s very existence.<sup>89</sup> Military *managers* worry exclusively about the product and neglect the leadership process.

*...a peacetime army can usually survive with good administration and management up and down the hierarchy, coupled with good leadership concentrated at the very top. A wartime army, however,*



*needs competent leadership at all levels. No one yet has figured out how to manage people effectively into battle; they must be led.*<sup>90</sup>

—John P. Kotter

## 21<sup>st</sup> Century Leadership: Leading the “Nexters” Generation

As discussed previously, Nexters already are more knowledgeable in nearly all aspects of the digital world than the vast majority of Xers and certainly the Boomers and Veterans. They think digitally with a depth of knowledge that will bring forth technological innovations of incredible dimensions if only we just get out of the way. Nexters bring a lot of weapons to the fight. The test of our leadership will be to take Nexter digital knowledge and experience and develop them into future leaders. Their out-of-the-box thinking—inherent in any new generation—is strength and must be recognized as such. Future wars will expose front-line marines, soldiers, sailors, and airmen to a wide range of threats. These threats include sticks and stones, as in the case of the Intifada versus the Israeli Defense Force, to precision weapons and Internet cyber-attack. The ancient and holy trinity of warfare—move, communicate, shoot—will be taken to whole new dimensions, requiring highly educated, trained, and experienced warriors.<sup>91</sup> As witnessed during Enduring Freedom, individual front-line soldiers are communicating and executing precision strategic strikes while in real-time direct contact with senior leadership half a world away. The sensor to shooter interface is fusing in front of our very eyes, no longer just a vision but a reality. Marvin Leibstone wrote of this very subject in 1994: “the advanced combat soldier will engage cooperatively in ways turning many forward echelon ground and air platforms into his parallel partners.”<sup>92</sup> Accomplishing this metamorphosis takes enlightened warriors with an extensive breadth of knowledge and experience. Their individual actions and real-time decisions will undoubtedly have immediate tactical, operational, and strategic effects.

Leading the Nexters will be different from previous generations in the specific areas of what motivates them or turns them off. But the fundamental

*The test of our leadership will be to take Nexter digital knowledge and experience and develop them into future leaders.*

1.	Assign all officers to operational units for first duty assignment to gain practical experience—including engineering, acquisition, and other Air Force Materiel Command duty specialties.
2.	Provide mandatory technical training in the individual's specialty (depth) as well as cross training in communications, leadership, logistics, and the art of war (breadth).
3.	Provide mandatory professional military education to enhance professional development and refocus the warriors at critical points in their career to ensure growth and maturation.
4.	Assign all officers to staff positions no more than 3 consecutive years before returning to operational units. Assignments to nonoperational jobs should be career broadening but temporary for military personnel.
5.	Ensure this roadmap for leadership development has a time line to ensure the right experience and training are accomplished at the right time during a career.

**Table 8. Roadmap—for All NCOs and Officers—  
to Develop Senior Leaders<sup>87</sup>**

21<sup>st</sup> Century Leadership:  
Leading the “Nexters”  
Generation

*There is a vast opportunity in the ranks of the Nexters as they enter the Armed Forces and make their presence known in the battlespace.*

1.	Establish standards early.
2.	Take care of your people.
3.	Look at yourself and be introspective.
4.	When leading in a crisis, be cool and flexible.
5.	Deal with cultural complexities and national antagonisms overseas.
6.	Do what needs to be done including firing a subordinate when necessary.
7.	Remember, succeeding may be measured more by how you handle failure than in how you handle triumph.

Table 9. Seven Basic Tips for Commanders<sup>93</sup>

leadership tools that worked for previous generations are still recipes for success today and tomorrow. Some salient *rules and tools* are addressed in Table 9.

There is a vast opportunity in the ranks of the Nexters as they enter the Armed Forces and make their presence known in the battlespace. General Charles C. Krulak, former Commandant of the Marine Corps, made a point of studying Xers and early Nexters to understand his target audience and capitalize on this knowledge during the crucial training cycles at Quantico and other installations.<sup>94</sup> Krulak is convinced that communication, “the passing of experience from one generation to another is the responsibility of every officer in our Corps.”<sup>95</sup> Nexters “want to be part of something that is recognized as a powerful entity.”<sup>96</sup> Maybe they want a sense of purpose.

Commanding Nexters and Beyond

*Fail to honor people, and they will fail to honor you; but of a good leader who talks little, when his work is done, his aim fulfilled, they will say: We did this ourselves.*<sup>97</sup>

—Lao-tzu, Chinese poet and philosopher

Summary

This article attempted to provide an answer to the question, how can experienced leaders of today’s military lead the newest generation—known as Generation Y, the Nexters, or the Digital Generation—of military professionals entering the ranks.

Table 10 summarizes the four primary generations of the last 60 years. Each generation was shaped by seminal events leading to their core values, heroes, and work ethic. Veterans were shown to be noble, Baby Boomers ideal, Xers independent, and Nexters a blend of their best qualities. Cultural differences add diversity and flavor to each new generation. The generational diversity seemingly creates conflicts and erects barriers between generations. Managers who want Nexters to conform to their expectations fear these challenges. These challenges that managers see

as crises with the Nexters, military leaders see as opportunities. Despite the reservations and concerns of Baby Boomers and Xers, Nexters are entering the workplace and military ranks probably with the best set of personal tools that any other generation has possessed.<sup>99</sup> Baby Boomers and Xers have a rich resource with which to lead the Armed Forces through any national security crisis. Despite this optimism for the Nexters, Baby Boomers and Xers must deal with an issue that cuts across generations. Anyone in uniform has repeatedly identified it as the number one issue impacting the unit, and it became glaringly obvious during the research for this article that it will continue to be the number one issue facing the Armed Forces for the foreseeable future—retention.

## Conclusion

Retention of quality leaders has plagued the Armed Forces for decades but has become more acute as our all-volunteer military relies more and more on our people versus our technology. What is quite evident from the research is that a sense of purpose, real responsibility, and a chance to lead are uppermost in the minds of junior officers and NCOs in all branches of the military.<sup>100</sup> Articles in the *Air Force Times*, *Navy Times*, *Marine Corps Gazette*, and *Army Times* all provide supporting comments from the Xer and Nexter enlisted and officer ranks. *Joint Forces Quarterly* and the *US Naval Institute Proceedings* articles echo the unofficial service newspapers. At the very heart of these articles lies the issue of retention. It is vital to the long-term health of the Armed Forces. Goestch summarized the feeling of many service members when he stated they “are not instilled with a sense of purpose.”<sup>101</sup> Three naval officers assigned to the attack submarine *USS Atlanta* responded to and expanded on Goestch’s article in the *US Naval Institute’s Proceedings*:

*The author is right, with few exceptions, as far as he goes. But he stops his analysis at the crucial point. Junior officers are leaving the submarine force not because of what they have to put up with but because of what is lacking. A sense of purpose, duty, and station are essential to developing a sense of, and a commitment to, one’s*

*Baby Boomers and Xers must deal with an issue that cuts across generations.*

	Veterans	Boomers	Xers	Nexters
	1922-1943	1943-1960	1960-980	1980-2000
Outlook	Practical	Optimistic	Skeptical	Hopeful
Work Ethic	Dedicated	Driven	Balanced	Determined
View of Authority	Respectful	Love/Hate	Unimpressed	Polite
Leadership by	Hierarchy	Consensus	Competence	Pulling
Relationships	Personal sacrifice	Personal gratification	Reluctant to commit	Inclusive
Turnoffs	Vulgarity	Political incorrectness	Cliche, Hype	Promiscuity

Table 10. Comparison Chart of How Each Generation Views the World<sup>98</sup>

---

## 21<sup>st</sup> Century Leadership: Leading the “Nexters” Generation

*Retention of superb leaders throughout the younger Xer and the new Nexter ranks will be the toughest leadership challenge of Baby Boomers and older Xers.*

*vocation. When officers leave the force, these elements are sorely lacking, if not missing altogether .... It is more than a trite patriotism or desire to serve one's country. It is a sense of professional tradition, pride, and duty, and an awareness of one's station within that profession—the feeling that no matter where you are in the chain of command, you are making a contribution.*<sup>102</sup>

—Lieutenant (Junior Grade) John Sharpe, USN  
Lieutenant Commander Chris Ratliff, USN  
Commander Kevin Peppe, USN

The target audience was the submarine force, but it is indicative of all services, as well as officers and enlisted.

Leadership and command of the Nexters is a challenge for Baby Boomers and Xers. Baby Boomers do not want to let go of the reins; Xers just now are finding their footing in a world that once overlooked them, while Nexters are technically capable of hitting the ground running in any capacity within a company or the military ranks. Followership will not be a problem for the Nexters, and they will not shrink from taking command when it is their turn. But retention of superb leaders throughout the younger Xer and the new Nexter ranks will be the toughest leadership challenge of Baby Boomers and older Xers.

### Implications and Future Research

Future research should focus on how to retain Nexters and ensure they have a sense of purpose and feel like they are making a contribution.<sup>103</sup> As stated earlier and confirmed by all the research for this article, retention of quality military leaders to build and maintain tomorrow's Armed Forces is critical. Two surveys should be accomplished to generate data. First, Baby Boomers and Xers should be surveyed to determine retention issues impacting their decisions to stay or leave the military. Officers and enlisted, at middle through upper leadership positions, should be part of the survey to get a complete cross section of issues impacting retention. Second, Nexters should be surveyed to determine their expectations as they enter the military and retention issues impacting their decisions to stay or leave the military.

Senior leaders of today must train, inspire, and retain outstanding military leaders for tomorrow's Armed Forces. As described by the naval submariners, retention is not tied to \$17K per year bonuses.<sup>104</sup> “A sense of purpose, real responsibility, and a chance to lead” coupled with “the feeling that no matter where you are in the chain of command, you are making a contribution.”<sup>105</sup>

### Notes

1. Rear Adm Donald R. Eaton, Retirement Speech Excerpt, 1993.
2. Ron Zemke, Bob Filipczak, Claire Raines, *Generations at Work: Managing the Clash of Veterans, Boomers, Xers, and Nexters in Your Workplace*, New York, AMACOM, 2000.
3. Zemke, Filipczak, and Raines, 3.
4. *Ibid.*
5. *Ibid.*

6. *Ibid.*
7. Zemke, Filipczak, and Raines, 3, 93.
8. Zemke, Filipczak, and Raines, 3, 28.
9. Lt (JG) John Sharpe, Lt Comdr Chris Ratliff, Comdr Kevin Peppe, “Generation X: One Wardroom’s Perspective” *US Naval Institute Proceedings*, Jan 96, 30.
10. Lt Hal Goetsch, “Keeping the Generation X Junior Officer,” *US Naval Institute Proceedings*, Oct 95, 69.
11. Ernest Blazar and Gidget Fuentes, “Generation X: Whatever...Do It.” *Navy Times*, 5 May 97, 13.
12. Goetsch, 69.
13. Eaton.
14. David Fromkin, *In The Time of the Americans*, New York: Alfred A. Knopf, 1995.
15. Zemke, Filipczak, and Raines, 31 and 65.
16. *Ibid.*
17. Ronald H. Spector, “The Generation of 1945,” *Joint Forces Quarterly*, Summer 1995, 61.
18. *Ibid.*
19. *Ibid.*
20. Zemke, Filipczak, and Raines, 30 and 68.
21. Zemke, Filipczak, and Raines, 34.
22. James Kitfield, *Prodigal Soldiers: How the Generation of Officers Born of Vietnam Revolutionized the American Style of War*, New York: Simon & Schuster, 1995.
23. Zemke, Filipczak, and Raines, 34 and 66.
24. Zemke, Filipczak, and Raines, 66.
25. Zemke, Filipczak, and Raines, 34.
26. Zemke, Filipczak, and Raines, 50.
27. Zemke, Filipczak, and Raines, 47.
28. Zemke, Filipczak, and Raines, 46.
29. Zemke, Filipczak, and Raines, 76.
30. Eaton.
31. Zemke, Filipczak, and Raines, 93.
32. Gen Henry H. Shelton, “A Word from the Chairman,” *Joint Forces Quarterly*, Spring/Summer 2001, 4.
33. Zemke, Filipczak, and Raines, 95 and 129.
34. Zemke, Filipczak, and Raines, 124.
35. Zemke, Filipczak, and Raines, 128.
36. Zemke, Filipczak, and Raines, 98.
37. Zemke, Filipczak, and Raines, 98 and 132.
38. Zemke, Filipczak, and Raines, 132.
39. Balzar and Fuentes, 13.
40. Zemke, Filipczak, and Raines.
41. Zemke, Filipczak, and Raines, 96.
42. Zemke, Filipczak, and Raines, 133.
43. Bryant Jordan, “Generation X,” *Air Force Times*, 14 Jul 97, 14.
44. Zemke, Filipczak, and Raines, 114.
45. Zemke, Filipczak, and Raines, 143.
46. *Ibid.*
47. Zemke, Filipczak, and Raines, 144.
48. Eaton.
49. Jack Scarborough, *The Origins of Cultural Differences and Their Impact on Management*, Westport, Connecticut: Guorum Books, 1998, ix.
50. Lt Col Neil Yamashiro, “Generation X.” Carlisle Barracks, Pennsylvania: Army War College Strategy Research Project, 7 Apr 98, 10.
51. Scarborough, 1.
52. *Ibid.*
53. Edgar H. Schein, *Organizational Culture and Leadership*, San Francisco: Jossey-Bass Inc, 1990, 16.
54. Schein, 17.



---

## 21<sup>st</sup> Century Leadership: Leading the “Nexters” Generation

55. *Ibid.*
56. Schein, 19.
57. Schein, 21.
58. Schein, 17.
59. Scarborough, 6.
60. Scarborough, 3.
61. Scarborough, 6.
62. Zemke, Filipczak, and Raines, 77.
63. Zemke, Filipczak, and Raines, 114.
64. Zemke, Filipczak, and Raines, 143.
65. Zemke, Filipczak, and Raines, 144.
66. Scarborough, 7.
67. Scarborough, 12.
68. Scarborough, 14.
69. Geert Hofstede, *Cultures and Organizations: Software of the Mind*, New York: McGraw-Hill, 1991.
70. Fons Trompenaars, *Riding the Waves of Culture: Understanding Diversity in Global Business*, Burr Ridge, Illinois: Irwin, 1994.
71. Jordan, 13.
72. Scarborough, 8.
73. Goetsch, 69.
74. *Ibid.*
75. Eaton.
76. Zemke, Filipczak, and Raines, 1.
77. Spector, 60.
78. Spencer Johnson, MD, *Who Moved My Cheese?* New York: G. P. Putnam’s Sons, 1998, 12.
79. Johnson, 30.
80. Johnson, 36.
81. Johnson, 46.
82. AU-2, *Guidelines for Command*, Maxwell AFB, Alabama: Air University Press, May 95, 17.
83. AU-2, 15.
84. AU-2, 8.
85. Maj Gen Perry M. Smith, *Rules & Tools for Leaders: A Down-to-Earth Guide to Effective Managing*, Honesdale, Pennsylvania: Paragon Press, 1998, 161.
86. *Ibid.*
87. Author’s recommendation based on 14 years as an Air Force engineer, aircraft maintenance officer, and professional logistician.
88. Col Timothy T. Timmons, *Commanding an Air Force Squadron*, Maxwell AFB, Alabama: Air University Press, 1993, 107.
89. Robert L. Taylor and William E. Rosenbach, *Military Leadership*, Boulder, Colorado: Westview Press, 1992, 22.
90. *Ibid.*
91. Marvin Leibstone, “Next-Generation Soldier: Ditched, or Digitized?” *Military Technology*, Jul 94, 59.
92. Leibstone, 61.
93. Smith.
94. Blazar and Fuentes, 13.
95. Lt Col Michael D. Becker, “Operations to Shape and Balance the Next Generation,” *Marine Corps Gazette*, Aug 96, 45-46.
96. Blazar and Fuentes, 14.
97. Eaton.
98. Zemke, Filipczak, and Raines, 155.
99. Zemke, Filipczak, and Raines, 143.
100. Goetsch, 66.
101. Goetsch, 69.
102. Sharpe, Ratliff, and Peppe, 28.
103. *Ibid.*
104. Sharpe, Ratliff, and Peppe, 30.
105. Sharpe, Ratliff, and Peppe, 28.

---

## William “Billy” Mitchell

Mitchell is the most famous and controversial figure in American airpower history.

Born in Nice, in 1879 and the son of a wealthy Wisconsin senator, he enlisted as a private during the Spanish American War. Quickly gaining a commission through the efforts of his father, he joined the Signal Corps. He was an outstanding junior officer, displaying a rare degree of initiative, courage, and leadership. After tours in the Philippines and Alaska, he was assigned to the General Staff—at the time its youngest member. He slowly became excited about aviation—which was then part of the Signal Corps—and its potential, and in 1916 at age 38, he took private flying lessons.



Arriving in France in April 1917, only a few days after the United States entered the war, he met with British and French air leaders to study their operations. He quickly took charge and began preparations for the American air units that were to follow. American aviation mobilization in World War I was not glamorous. It was months before pilots arrived in France and even longer for any aircraft. Nonetheless, Mitchell was a daring, flamboyant, and tireless leader. He was elevated to the rank of brigadier general and commanded all American combat units in France. In September 1918, he planned and led nearly 1,500 allied aircraft in the St Mihiel offensive. Although the top American combat airman of the war, he managed to alienate most of his superiors during his 18 months in France.

Upon return to the United States in 1919, he was appointed as deputy chief of the Air Service, retaining his one-star rank. His relations with superiors continued to sour as he began to attack both the War Department and the Navy for being insufficiently farsighted regarding airpower. His fight with the Navy climaxed with the dramatic bombing tests of 1921 and 1923 that sank several battleships, proving—at least to Mitchell—that surface fleets were obsolete. He also experienced difficulties within the Army and, in early 1925, reverted to his permanent rank of colonel and was transferred to Texas. Although such demotions were not an unusual occurrence at the time, the move was seen as punishment and exile. Not content to remain quiet, when the Navy dirigible *Shenandoah* crashed in a storm and killed 14 of its crew, he issued his famous statement accusing senior leaders in the Army and Navy of incompetence and “almost treasonable administration of the national defense.” He was court-martialed, found guilty of insubordination, and suspended from active duty for 5 years without pay. He elected to resign instead and spent the next decade writing and preaching the gospel of airpower. Mitchell died 19 February 1936.

[Online] Available: <http://www.airpower.maxwell.af.mil/airchronicles/cc/biograph.html>

